ARCHIVES OF OPHTHALMOLOGY.

REPORT OF A CASE OF ORBITAL CAVERNOMA REMOVED BY KRÖNLEIN'S METHOD, WITH PRESERVATION OF THE EYEBALL.

By Dr. ARNOLD H. KNAPP, New York.

Mrs. A. R., thirty-four years of age, noticed a protrusion of the right eye six or seven years ago. The exophthalmos has increased gradually, and was accompanied by failure of sight during the last two years. General health has always been good.

On **examination** the right eye appeared to be pushed straight forward. The exophthalmos measured about 12 *mm.* Motility of the eye was slightly restricted in all directions, especially upward. Palpation within the bony margin of the orbit was negative; any manipulation caused a luxation of the eyeball. V = $\frac{1}{200}$. Field normal. The ophthalmoscope showed a pronounced papillitis (elevation of the disc measured 5D). The nose and accessory cavities were normal.

Clinical Diagnosis: *Orbital tumor situated within the muscular cone, not directly involving the optic-nerve structures.* The patient consented to the operation with the understanding that the eye should be removed if found necessary.

Operation: August 1, 1899. Ether. A slightly curved vertical incision was made along the outer bony margin of the orbit, dividing the periosteum. The periosteum lining the inner side of the lateral wall of the orbit was retracted, together with the soft orbital contents, and the inferior orbital fissure localized. From the anterior end of this fissure the bony wall of the orbit was cut through with a chisel along two diverging lines: the one passing up and out to the external angular process of the frontal bone, practically in the suture between the great wing of the sphenoid and the malar bone; the other in a horizontal plane passing out and forward, appearing on the external surface of the malar bone, in a line directly above the insertion of the zygomatic arch. This wedge-

shaped piece of bone, with its muscular and cutaneous attachments, was strongly forced backward, giving free access to the orbit. The periosteum was incised in a horizontal direction. Palpation revealed a firm round tumor situated behind the eyeball. The soft parts were divided below the external rectus down to the tumor. The tumor could then be freed from its attachments by the finger, and shelled out. The hemorrhage was very slight. Careful palpation of the walls and apex of the orbit and of the optic-nerve structures revealed no abnormity. The eyeball was pushed back, the osteoplastic flap replaced, and the wound closed with deep and superficial sutures.

Beyond a slight swelling of the right half of the face, the subsequent course was undisturbed and afebrile. The wound healed by primary union; the bone flap had remained in place, and the patient was discharged on the tenth day.

August 17th.—No deformity except cicatrix in skin. V with $+ 4.5 = \frac{20}{200}$. Pupil moderately dilated. Diplopia at limit of outer and of upper fields. Swelling of optic disc has gone down except below. Eye in normal position. Sensation normal.

November 12th.—V with $+ 4 = \frac{20}{70}$. Otherwise as before.

February 19, 1900.—V with $+ 4 = \frac{20}{60}$. Disc shows no swelling but slight choroidal atrophy below. Paresis of ext. rectus as before, causing diplopia on looking to right at about 60° from primary position. Abduction to the canthus. Diplopia also in extreme upper part of field of fixation. The diplopia has not increased, and is not troublesome. Pupil normal. No deformity whatever.

The **tumor** is smooth, oval, semisolid, bluish red, and measures 22 by 30 *mm.* Microscopically it presents the picture of cavernous tissue surrounded by a thin capsule. The open spaces are filled with blood cells and lined with endothelium.

Anatomical Diagnosis: *Cavernous angioma.*

Remarks.

In this case it was possible with the aid of Krönlein's operation to remove a tumor, 22 by 30 *mm.* in size, from the orbit, preserving the eye and restoring its vision. It is very questionable whether this tumor could have been removed in any other way without sacrificing the eye. Krönlein[1] described this method in 1887, and recommended it

[1] Krönlein, "Zur Pathologie und operativen Behandlung der Dermoidcysten der Orbita." *Beiträge zur klinischen Chirurgie*, 1889, vol. iv., pp. 149–163.

for the removal of deep-seated dermoid tumors in the orbit. The procedure did not become better known until Braunschweig's publication appeared in 1893.[1] Since then a steadily increasing number of cases have been published. Schlodtmann[2] was able to collect twenty-six cases where Krönlein's method had been employed; five of these were tumors of the optic nerve. Tumors involving the optic nerve require the removal of the nerve, and interference with the principal nutrient vessels of the globe is thereby unavoidable, hence the preservation of the eyeball in its normal shape is much more difficult than in the case of tumors not directly in connection with the optic nerve. The results, consequently, in these two classes of tumors cannot be compared, and our remarks will be limited to the latter class.

The other and older method of attacking the orbital tumor from in front, by entering between two recti muscles or by the temporary division of one or more of these muscles, with preservation of the eyeball, has been more or less successful in certain cases, though it is impossible to learn in how many cases the attempt was unsuccessful and the eyeball had to be sacrificed. The manipulations are necessarily difficult, the dissection has to be done at a depth, that is, in the dark; hemorrhage may be very disturbing, and the structures vital to the preservation of the eye are liable to injury; the luxated eyeball is jammed against the orbital margin during the entire operation, which may not be without danger, if the vision of the eye is to be restored or improved.

The resection of the outer wall of the orbit, which as to technic is not difficult, permits a thorough exploration of the entire orbit by gaining access to the part behind the eyeball, and the tumor can be freed from its surroundings in a much more careful manner. Whatever difficulties may arise from the size of the tumor or hemorrhage would occur in a more accentuated manner in the older method. If the attempt is unsuccessful, exenteration of the orbit can always

[1] Braunschweig, "Die primären Geschwülste des Sehnerven." *Archiv f. Ophthalmol.*, 1893, vol. xxxix., 4, p. 1.

[2] Schlodtmann, "Über die Extirpation retrobulbärer Tumoren," etc. *Festschrift f. A. v. Hippel.* Halle, 1900.

be done. The replacement of the fragment of bone and its retention in the normal position do not offer any difficulty. Sokolow[1] makes four holes in the resected bone and passes sutures through them to aid in holding the bone in place; a procedure which hardly seems necessary. Braunschweig[2] has practised the osteoplastic resection in the treatment of orbital cellulitis with success, and thinks that it is justifiable to try this procedure for exploratory purposes.

The one disadvantage of this method is a subsequent disturbance of motility in the eye. Schlodtmann found that in the twenty-six cases operated on after Krönlein, all suffered from a more or less complete loss of abduction, except in one case where the adduction was affected, and in one where normal motility resulted. It is clear that the abducting power is interfered with either by direct injury to the external rectus or its nervous supply, or by adhesions occurring during the process of repair. The degree of annoyance occasioned by this limited motility is of course proportionate to the amount of sight regained. In the case described in this paper the disturbance of motility was very slight and not progressive; the diplopia occurring only at the outer and upper limits of the field of fixation. The incision of the periosteum should therefore be made without invading the region of the external muscle, and the dissection subsequently should be done with as little traumatism of the surrounding parts as possible.

[1] Sokolow, *Wratsch*, 1898, No. 33.

[2] Braunschweig, "Weitere Erfahrungen über die Krönleinsche Operation." *Ophthalmolog. Klinik*, 1897, No. 1, p. 4.

IRITIS, THE RESULT OF DENTAL IRRITATION.[1]

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WELL defined cases of inflammation of the eyes due to reflex troubles are not of sufficient frequency to make the report of a case without interest. In my own experience the case I am about to report is the only one I have seen.

According to J. W. Lawford, in Norris & Oliver's *System of Diseases of the Eye*, many observations on reflex irritation, due to decaying or decayed teeth, have been noted. Diseases of the conjunctiva, cornea, and iris have been the ones most frequently reported. Amblyopia of varying degree has been recorded by numerous writers. Ophthalmoscopic changes, however, have not been present. Secondary optic neuritis has been observed, usually following disease of the antrum or orbital cellulitis. The majority of dental reflex eye disturbances, however, have been those of diminished accommodation, and Schmidt (*Arch. für Ophthalmologie*, Bd. xiv., Abth. 1, S. 107) has noted seventy-three cases of weakened accommodation out of ninety-two recorded.

Ziem (*Centralbl. f. Augenhk.*, vol. xi., p. 358) has reported three cases of iritis from suppuration of the nasal cavity, in which the author thinks the septic material was carried through the circulation from one cavity to the other. Whether or not all reflex diseases are necessarily septic in their nature has not yet been thoroughly established. The

[1]Read before the Cuyahoga County Medical Society, Feb. 1, 1900.

general trend of modern belief, however, seems to be in this direction. Certain cases of sympathetic irritation and inflammation of the eyes have been reported where it is rather difficult to believe that such is the case. Just how septic material can be carried in these cases is difficult to explain. Also, on the theory of septic infection, it is not clear how prompt relief comes by the removal of the original source of irritation. The more clinical evidence we are able to present along these lines, however, the better we may be able, as time goes on, to explain the phenomena of reflex trouble.

On the 9th of Sept., 1899, Miss C. D., æt. about twenty-three or twenty-four, called upon me and gave me the following history. Four weeks previous she had had an attack of acute inflammation in the right eye, which very greatly disturbed her vision and produced much sensitiveness and blurring, with some pain. At the time she was absent from the city in W. Va., and had been treated there by a medical practitioner. The difficulty, however, had not subsided, and my examination showed the following conditions at the time of her visit. O. D. v = $\frac{6}{9}$ — 3. O. S. v = $\frac{6}{9}$ — 2. At 20 feet there was 15° of esophoria, and $\frac{1}{2}$° of right hyperphoria. The movements of the eye were good in all directions. There was some general redness of the conjunctiva, the cornea was clear, the iris showed a very little discoloration, there was by oblique illumination a ring of pigment matter on the anterior capsule of the lens, and there was a nicking of the pupil at the lower margin, with an evident inflammatory band at that point. The ophthalmoscope showed the vitreous entirely clear, with a normal eye-ground, except that the upper, inner and lower margins of the disk were quite veiled. The veins were full and dark, the arteries large but not tortuous, and there was a general fine granular condition of the fundus, with probably a low myopic astigmatism. In the left eye the pupil was larger than the right, but there were no evidences of irritation other than slight striations along the vessels. An examination with Javal's ophthalmometer indicated 1.50 D. at 90° in each eye. So far as the general condition of the patient was concerned, she was a large, well-developed, robust-looking individual, who had never suffered from any serious illness, headaches, nor any eye strain, although she had completed

a course in one of the leading colleges of the country. There was not the slightest evidence of any inherited or acquired constitutional disturbance, nor was there any history of rheumatism. Under the use of atropine, the pupil dilated well and regularly in all directions except downward, where there was a very strong broad posterior synechia. This was sufficiently large to produce nearly a kidney-shaped pupil, especially during the early stages of the action of the atropine. Under the continued use of the atropine the redness and irritation of the eye, both externally and internally, gradually cleared away, so that within a month there was no evident presence of acute trouble, only there remained a band of adhesion at the original site. The atropine was then omitted and the pupil came back to its normal size in due time, leaving the eye quiet and the patient able to do a considerable amount of reading.

On the 15th of the following Nov., Miss D. again came to my office stating that the day before she had had some discomfort with the left eye, with tenderness on pressure in the upper portion. Examination indicated a considerable amount of conjunctival injection, and there were photophobia with some lachrymation and entire inability to use the eye for close work. An examination disclosed no discoloration of the iris and the pupil responded promptly to light. The condition present was very much such as would be the case in the initial stage of an acute iritis, and no doubt there was deep congestion, as was indicated by tenderness on pressure, the eye being very sensitive under the finger. She stated that the attack in this eye came on almost exactly as in the fellow eye. Immediately a boracic acid wash was ordered to be employed and hot fomentations applied for twenty minutes several times a day. There was little improvement in the congestive condition of the eye for the next five days. On Nov. 20th, in addition to the irritation of the eye, I discovered a considerable amount of swelling over the left jaw, extending nearly over the entire side of the face. Inquiry developed the fact that she had lost part of a filling from the third last molar on the left side, ten days previous. This filling had been placed two years before, but up to this time she had never had an attack of inflammation of the tooth. At this time there was much swelling and tenderness of the jaw about the tooth. The discovery of this, of course, at once put us upon our guard as to the possible source of irritation in the eye. She

stated at this visit that the day before she had had much pain all through the side of her head, and now the jaws were so stiff that they could be separated only a very little. In the eye itself there was some blurring, the injection was decidedly increased, there was a good deal of pain on accommodation and much photophobia. Inquiry at this time elicited the fact that at the time of the attack in the other eye, in August, she was suffering from the effects of a wisdom tooth just cutting its way through the gums, and it had been a source of great irritation for several weeks. With this information at hand, atropine was immediately ordered for fear of an attack of plastic iritis in this eye. The patient was also given a note to her dentist and directed to see him immediately and have the cavity of the tooth cleaned out. Three days after this, the patient reported that within two hours after the removal of the old remnants of filling and the cleaning out of the cavity of the tooth the entire irritation of the eye had disappeared and since then she had been perfectly comfortable. The eye itself showed very marked improvement in every way, the conjunctiva had cleared up, the pupil was widely and fully dilated, and an ophthalmoscopic examination at this time showed the irritation of the deeper structures to have disappeared.

It seemed to me that there could be no question as to the irritative tooth having been the cause of the inflammation in each eye. Certainly the fact of the immediate relief afforded in the case of the second eye by the removal of the contents of the tooth cavity is proof positive of the relationship between the two conditions. The corresponding history elicited in the case of the other eye likewise seems to me to indicate a definite relationship between the inflammation of the tooth and the positive inflammation of the eye. In the second attack, especially, it is extremely difficult to understand how the attack of inflammation of the eye could be due to a conveyance of septic material by any means from the tooth to the eye, unless there are physiological laws governing the transmission of morbid material from one portion of the body to another which we do not appreciate. It is not possible to comprehend the action of microbic material which produces symptoms of irritation of this sort, with immediate subsidence of the same upon the removal of the

original source of infection. Of course in the second eye that was involved in this case, we must remember that there was not a positive iritis, with the throwing out of plastic material, which was present in the previous attack, but it is not at all improbable that such would have been the case if the original irritation had been allowed to continue a sufficient length of time to produce a manifest state of inflammation. At present there is no way of knowing how long after the first attack it was until the iris became adherent to the lens capsule. Since then the patient has gone on with no discomfort whatever, and has made a most happy recovery.

A CASE OF CONTUSION INJURY OF THE EYE-BALL, FOLLOWED BY FULMINANT GLAUCOMA; RECOVERY WITHOUT OPERATION.

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ON account of several peculiarities of this case which, in my experience, are unique, and of which I have found no exact parallel in the literature of the subject, I have thought it worthy of report to the profession, and beg to submit the following from my case-book:

On August 19th, Mr. J. L. C., while a passenger on a railroad train running at full speed, was struck in the right eye by a stone, about the size and shape of a guinea-hen's egg, thrown from without by a malicious negro youth. The stone shattered the thick glass of the car window and came in contact with the eyeball with sufficient force to daze the patient completely and effectually destroy the vision of the eye for some time, not to speak of the excruciating pain inflicted. After perhaps fifteen minutes were consumed in stopping the train and instituting a fruitless search for the offender, the patient was placed in a berth, and iced towels were applied until his arrival at my office in Norfolk two hours later.

At this time an examination revealed no contusion or swelling of the lids, which would seem to indicate that so sudden and unexpected was the blow they could not be closed in time to assist in the protection of the ball. The pain had greatly subsided and, strange as it may seem, the only evidences of injury were a bluish-red spot about the size of a dime over the lower-inner quadrant of the ball in the ciliary region, a small hemorrhagic extravasation under the surrounding conjunctiva and a slight hemorrhage in the anterior chamber. The latter was, however, sufficient to prevent a satisfactory examination of the interior of the eye at this sitting.

The pupil was somewhat contracted, iris intact, tension normal, chamber of normal depth, conjunctival and other coats unbroken, and vision $\frac{15}{200}$. The eye was thoroughly cleansed, a one per cent. solution of atropia instilled, and the patient put to bed with instructions to keep iced applications to the eye for several hours.

Aug. 20th.—On this date the eye was free from pain, only slightly tender on pressure in region of injury, extravasation under conjunctiva more extensive, but hemorrhage in anterior chamber reduced to the extent of permitting a satisfactory examination of the fundus. Pupil dilated ad max. from atropia, chamber normal depth, tension normal, vision $\frac{1}{10}$. The ophthalmoscopic examination revealed a very slight hemorrhagic extravasation in the vitreous in the region just under the contusion. In the region opposite, *i. e.*, in the upper-outer quadrant, there was presented a typical picture of commotio retinæ, and within this whitish area were several small subretinal hemorrhages. No lesion in the macular region, and no trouble with the optic nerve was observed. Treatment of the 19th was continued. For the next three days the condition, with the exception of some improvement in the commotio retinæ, remained practically unaltered.

Aug. 24th.—To-day patient complained of some pain, described as a "steady ache," and his vision was "somewhat blurred." Pupil dilated, iris congested, but no adhesions, eye *very tender to pressure*, and I noticed for the first time that the anterior chamber had become very shallow, the iris being pushed almost in contact with the posterior surface of the cornea. The hemorrhage had entirely disappeared from the anterior chamber. The ophthalmoscope revealed no deposit on the posterior surface of cornea, but a slight—apparently sero-fibrinous—deposit on the posterior surface of the lens, a very few hemorrhagic flocculi in the vitreous, and a beginning neuritis. The evidences of retinal concussion had entirely disappeared, and the small hemorrhagic spots in this region were much smaller. It was observed that the lens was slightly tilted at its upper-inner quadrant, the pupil was not exactly round, and the iris was bulged slightly more forward over this part of the lens. The tension was little elevated, certainly less than one would expect with the above mentioned conditions. The artificial leech was applied to the right temple, small doses of potassium iodide were ordered, and a myotic, composed of eserine sul. gr. $\frac{1}{4}$, pilocarpine mur. grs. ii., aquæ dest. ℥ ss., ℿ Sig.—Two drops to be instilled every two hours until extreme myosis is accomplished,

was used. Up to this time the eye had been protected from the light by a bandage, but at this time the eye became so sensitive to the pressure of a bandage that a shade was substituted.

Aug. 25th. — To-day eye is free from pain, pupil contracted fairly well under myotic, but chamber of no greater depth, nerve head more congested. Ball very tender to pressure. Tension very slightly elevated. Treatment: Myotic, iodide potash, hot applications, and derivatives.

This condition changed very little for the next three days, and the patient becoming very restless and uneasy I suggested consultation. Accordingly Dr. John Dunn and Dr. J. P. Davidson of Richmond were consulted, the patient standing the short trip necessary to reach them with no discomfort to the eye. The consultation, while revealing some difference of opinion as to the gravity of different symptoms, resulted in an endorsement of my treatment, and a recommendation of its continuance as long as the eye remained in this condition. The patient spent a good night and experienced no discomfort during the trip to Norfolk the next morning, but on the day following, the eye being slightly painful, the leech was again applied with the result of lessening the pain and tenderness. The chamber remained the same. From this time there was little discomfort experienced until Sept. 6th, when the eye again became painful and the leech was once more applied.

From this date the eye gradually improved in all respects and I was beginning to congratulate myself that the worst was over, and encouraged my patient by the expression of this belief.

Sept. 12th, one week later, I was hastily summoned to relieve him of an "agonizing pain" in his eye. I found him much depressed, rolling and tossing with pain, extremities and body cold and clammy, much nauseated and vomiting, lids somewhat swollen, great ciliary congestion, cornea clear, pupil slightly dilated, iris congested, chamber *so deep* as to suggest adhesion to lens, no adhesions of iris, but a slight exudate in pupillary space, vision abolished, tension + 3. In short he was wrestling with an attack of fulminant glaucoma (acute cyclitis). Treatment: ¼ grain morphia sul. hypodermatically, leech to temple, myotic, and hot applications to body and extremities. He became much more comfortable under this, and there was noted a slight decrease in tension. Consultation was again held. Dr. Dunn responding, Dr. Bryant, the patient's family physician, was also requested to be present. Dr. Bryant reported that the patient had for years been a victim of

malaria and had once had a congestive chill. This determined us in trying the effect of full dose of quinine combined with sodium salicylate. He was accordingly given during the succeeding twenty-four hours eighty grains of quinine and thirty grains of sodium salicylate. These were administered per rectum as his stomach would not retain anything. Only thirty grains of the salicylate could be retained.

On the following day the condition of the eye was markedly improved in all respects, tension + 1, ciliary injection diminished, pupillary area much clearer, pain slight, vision improved to the extent of recognizing faces at close range. The quinine was continued to the point of slight cinchonism throughout the following week, and then withdrawn. From this time recovery was rapid, and in four weeks the eye was free of all trouble except a slight paresis of the sphincter iridis. Vision, with the assistance of a mild myopic cylinder, $\frac{1}{18}$.

The features of interest to me in this case are: (1) The slight mechanical injury to the ball from a blow of such violence. (2) The forward dislocation of the lens coming on several days after the injury in the absence of much tension. (3) The long-delayed high tension and cyclitis in the presence of an apparently closed iris angle for nineteen days. (4) The suddenness of the attack just as there seemed to be some deepening of the chamber and when patient seemed in a fair way to recovery. (5) The rapid subsidence of the extremely acute inflammation under full doses of quinine.

CONTRIBUTIONS TO THE DIAGNOSIS, SYMPTOMATOLOGY, AND STATISTICS OF CONGENITAL COLOR-BLINDNESS.

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(With four figures on Plate II. of Vol. XXXVIII., German edition, and one diagram in the text.)

OF the different methods employed for the diagnosis of congenital typical color-blindness, the colored worsteds of Holmgren and the pseudo-isochromatic plates of Stilling are those most widely used.

When I recently went through these tests it appeared that I was not color-blind, but had a weakened power of discriminating between colors, a so-called reduced color-sense.

In fact, however, as I have long known, I am typically color-blind, being a deuteranope[1] according to v. Kries's method of designation, green-blind according to Helmholtz's nomenclature, and relative yellow-seeing, red-green blind in the sense of the supporters of Hering's color theory.

They that believe in the cure or improvement of color-blindness by practice would have regarded the results of the

[1]NOTE ON NOMENCLATURE.—A person who possesses the three fundamental color-perceptions according to the Helmholtz theory — red, green, and violet — is said to be trichromatic; if perception of one color is wanting (partial color-blindness) he is said to be dichromatic. According to von Kries's nomenclature, one who is red-blind is called a protanope, one who is green-blind a deuteranope, and one who is violet-blind a tritanope.—TRANS.

tests as an argument in their favor, since I have been occupied in the last ten years with the comparison of colors in the spectroscope, etc. I knew, however, that I was color-blind and that the tests employed were insufficient. I had never practised with the Holmgren or Stilling test and the fact that in my case a wrong diagnosis was obtained by the use of the tests most generally employed led me to try the reliability of these tests in the case of other people. It soon appeared that the methods of Holmgren, Stilling, and some others are in part wholly unreliable, and in part reliable when certain precautions are taken.

I—ON HOLMGREN'S WORSTED TEST.

In order to show how greatly the results of the test depend upon the collection of yarns used, I wish to present the findings with four different sets. In the Freiburg Physiological Institute were three different sets: one selected from local shops, one put on the market by Dörffel of Berlin, and the third obtained from Letty Oldberg of Upsala.

In my first trial with the Berlin set I matched with the light-green sample, gray and grayish-brown (but not rose) as well as green. According to Holmgren, such an error does not prove the existence of color-blindness. As I show later a number of persons who made this mistake had not a dichromatic but a trichromatic color-sense, although with diminished powers of differentiation.

The second test with purple (or rose) is supposed to show whether there is color-blindness or only a reduced color-sense. He that matches only purple with the test-color may, according to Holmgren, have a reduced but nevertheless a trichromatic color-sense.

With this purple test I did not make a single blunder and felt quite positive in distinguishing purple from gray, bluish green, red, and violet. Nor with Holmgren's third test with a saturated spectral red did I make any mistakes.

In tests with another set of worsteds I made no blunders with either the green or the purple.

I then went to the eye clinic and made the tests successfully with their set of worsteds, and was assured that I was

not color-blind but at the most merely weak in color-sense, since I selected the colored yarns rather more slowly than persons with normal trichromatic perception.

The Swedish set was better than the rest in that it contained more confusion colors and when only a few greens were left in and the bluish-greens and yellowish-greens were removed, I failed almost always on the green test. Holmgren intended the bluish-greens and yellowish-greens to be used only in the tests for the diagnosis of tritanopsia and stated that these yarns should not be mixed with the others. If bluish-greens were present I carried out the test successfully.

I was successful with the purple test also, when the Swedish set was used. According to the results obtained with the best of the worsted tests, I was what Holmgren would call "incompletely color-blind." Yet in my case this diagnosis was entirely wrong, although as a matter of fact my case is exceptional, and I have found but a single other green-blind person who blundered in the test for green but did the purple test successfully. My experience with the purple test can hardly be used as an argument against the practical value of Holmgren's method.

There is, however, one practical point that I wish to call attention to. In my case I matched the purple test skein perfectly, but failed always on the green when the set of yarns was properly composed. Yet Cohn and Daae have proposed that the purple test be made first and the green resorted to only when mistakes have been made with the purple. This "simplification" of the test in the light of my personal experience does not seem judicious.

In Holmgren's statistics the red-blind and the green-blind appear in about equal numbers, and in many other statistics the red-blind predominate. In our extended tests many more green-blind were found than red-blind. On the other hand, we found but a single case corresponding to what Holmgren calls "incomplete color-blindness," but such cases Holmgren found to be nearly as frequent as the combined red-blind and green-blind. Is it not probable that many of Holmgren's cases of "incomplete color-blindness" were in reality cases of green-blindness?

However this may be, to my mind the green test should be retained as the first test, and in general tests of large numbers of persons it should be considered the decisive test in diagnosing whether or not the color-sense is normal. The purple test cannot be neglected since it is the most convenient for distinguishing between protanopes and deuteranopes.

When large numbers are not being tested at a time and there is opportunity for more extended tests, it is advisable not to limit the tests to green, purple, and red, but to make other tests. Apart from the test mentioned above for the detection of tritanopsia, namely, separating all greens into a group of blue-greens and a group of yellow-greens, the use of a brownish-green and of a saturated violet is advisable. This test again serves to distinguish protanopes from deuteranopes. The latter match blue with violet, and if they add purple also, green-blindness is practically excluded, and if any color-blindness exists, only red-blindness can be thought of. Furthermore, as I shall show below, a blunder with the violet test proves just as little as a blunder with the green or purple test that the color system of the person being tested is dichromatic.

II—ON DAAE'S COLOR CHART.

Dr. Daae's arrangement for testing with the colored worsteds consists of seventy colored fields arranged in ten horizontal rows on a chart. One row contains greens of various luminosities, another reds, and the others mixed colors. The person examined states whether the first row appears uniform in color, and then succeeding rows are observed. If he calls a row uniform which is not, he is color blind.

The main fault with this arrangement is that in the really isochromatic rows the successive squares gradually grow darker, while in the pseudo-isochromatic rows light and dark, saturated and unsaturated colors follow at random. Therefore, even to the person with dichromatic color-perception, it is at once evident that these rows differ from the others. The first time that I saw the chart I picked out the lines

correctly. The principle of the method is good, but the present arrangement of colors bad. In each row the sequence of colors, whatever the hue, should be from light to dark; and interspersed here and there should be rows of uniform color.

III—ON STILLING'S PSEUDO-ISOCHROMATIC COLOR CHARTS.

Next to the worsted test, Stilling's charts are most frequently used. The advantages of the test are its simplicity, the fact that the person being examined need not even know that his color-sense is being examined, and the fact that the person being examined does not need to be directed actively by the examiner, so that embarrassment is less likely to be a disturbing factor in the test. But the test has many disadvantages which must not be overlooked.

In the directions there is no information as to the distance from which the charts should be viewed. Some ophthalmologists place the charts at a distance of 3 *m*, others put them into the patient's hands. For my own part, most of the charts at 3 *m* distance cannot be read at all, or with difficulty. At 2 *m* they are read with more ease, and at 1 *m* much more readily.

Stilling says: Charts I, II, III, IV, V, VI, and VII, serve to determine the color-sense for red-green. He that cannot read all the first three is red-green blind. He that cannot decipher all of IV and V, but reads I, II, and III, has a diminished perception for red-green. He that cannot decipher VI and VII is also red-green blind, but these two charts serve to distinguish the two chief forms. He that can read VI but not VII has a diminished perception for red, *i. e.*, a spectrum shortened at the left end. He that can read VII but not VI has an unshortened spectrum and normal or almost normal perception of red. Chart VIII serves to determine the color-sense for blue-yellow. He that claims that he cannot read chart X is surely a simulator. He that claims to be red-green blind must be able to read Chart X; the inability to read this is a proof of simulation.

Tested with Stilling's charts at a distance of 3 *m*, I found that I was

a) according to Charts I–VI taken together, red-green blind;
b) by comparison of VI and VII, red-blind (protanope), with shortened spectrum;
c) according to II and IV, normal;
d) according to IX, a simulator;
e) according to X, at least not a crude simulator.

In tests with the charts near by, I was
a) according to Charts I–V taken together, not color-blind, but had a diminished perception of red-green;
b) according to VI and VII, not red-blind, but rather green-blind (deuteranope), with unshortened spectrum;
c) according to IX and X, a simulator (as above).

In fact, I am a typical deuteranope, with unshortened spectrum. Similar confusing results were obtained in testing a number of typical protanopes and deuteranopes. These results are not only of theoretical interest, but of practical interest as well, since they show that these charts are utterly unsuited for testing seamen and railway employés.

IV—ON PFLUEGER'S CONTRAST METHOD.

This method of testing the color-sense is related to that of Stilling and has the same advantages, but, as it seems to me, it is less adapted than the other as a sole test for the determination of color-blindness. In this test black and gray figures and letters, printed on a colored ground, are covered with from one to three sheets of silk paper. The characters then become invisible to the color-blind, but persons with good color-perception see them in a color complementary to the ground.

The first disadvantage of the method is that the sheets of silk paper soon do not lie flat, and in being smoothed out are quickly soiled and wrinkled. Furthermore, the normal eye will not always be able to decipher all the charts.

In the accompanying text there is no statement as to what may be expected from a normal, a weak, and a dichromatic color-sense. Every one who uses Pflüger's charts must obtain this necessary information by tedious experiment.

I am convinced that after this experience is acquired one

can differentiate normal, weak, and dichromatic color-sense satisfactorily, but many false diagnoses will first be made if this test alone is relied upon. The differentiation between one actual color-blind and a trichromatic person with reduced power of distinguishing differences of color, will be difficult, since both will read approximately the same lines.

V—ON NEW PSEUDO-ISOCHROMATIC COLOR CHARTS.

The unfavorable experience I had had with the Stilling and Pflueger color charts led me to devise a set for my own use, which would fulfil the purpose even if the reproduction of the printed plates should not be altogether perfect.

With color charts made according to Stilling's principle, if the apparent similarity between the ground and the printed figures is not absolute, the person with dichromatic color-sense will recognize the figures despite his color-blindness. The figures need not appear to differ in color, but a slight difference in luminosity will enable him to follow the contours and recognize the figures.

If, however, colored dots, which appear nearly alike to one with dichromatic color-sense, are arranged in irregular sequence in a circle, this color ring will appear to him, even if the confusion colors are not accurately reproduced, similar to or identical with another ring of dots of uniform color but of different luminosities. For example, a ring in which green and gray dots alternate will appear to him identical with a ring in which light- and dark-gray dots alternate, or with one in which light and dark-green dots alternate. All these rings will appear to him to be of one color, and if the colors are carefully chosen, the ring composed of two colors may give him more the impression of being of a uniform color than the ring actually of one color with its dots alternatingly light and dark.

I have had charts of this sort reproduced by lithography and published by J. F. Bergmann, Wiesbaden, with detailed directions for use. Four of these rings are shown on Plate II., accompanying this article, not for the purpose of being used for the detection of color-blindness (all twelve charts must be used for this), but merely to illustrate the points I have

been making. The collection of twelve charts contains three color rings, which will be declared by all persons having normal color-perception to consist of a single color only (see Fig. 5, Pl. II.); rings which contain the typical confusion colors of the protanopes, deuteranopes, and tritanopes; and one ring which cannot strictly be considered of uniform color but whose recognition does not indicate color-blindness. The rings are to be viewed from a distance of $\frac{3}{4}$ *m*.

This method is not a new one, but is rather a combination of Stilling's and Daae's methods, which appears to me to have advantages over both. In order that reliable results be obtained and accurate diagnoses made, it is necessary that the test should follow the directions laid down.

When large numbers of persons are to be examined, this method of examination is no more advisable than are those of Stilling and Daae. If the purpose of such investigations is to discover the cases of typical color-blindness, I would recommend the employment of my color apparatus for diagnosis, described below. If those weak in color-perception are also to be discovered, Holmgren's test should be used, but the results should be controlled by using the spectroscope or one of my two diagnostic methods, since otherwise, as I shall show farther on, a number of persons with weak color-perception might be declared to be color-blind, and, on the other hand, persons with dichromatic color-sense might be classed as having a weak trichromatic color-sense.

VI—A NEW METHOD OF TESTING WITH COLORED GLASSES.

(*An apparent equivalency of red and yellow.*)

In 1896, Prof. v. Kries was experimenting with me and other persons with dichromatic color-sense, by making equivalent reds and yellows by means of Helmholtz's color-mixing apparatus. It struck me at the time that these comparisons, which are so well adapted for separating the two most frequent types of color-blindness, must also be well adapted for the practical diagnosis of color-blindness. When my eye is fairly adapted for light, the varying of luminosity

alone will cause red and yellow to appear to me equivalent. This is also the case with the red-blind, except that the red must be made five times more luminous than in the case of the green-blind. I tried the following method on some actual dichromatic persons, and also on two who were sent to me as being color-blind, but were proved not to be so.

1. I made a comparison of lithium red and sodium yellow, which was unequivalent for both types of dichromatic persons, *i. e.*, I made the red much darker for my eye than the yellow; for the protanope, therefore, the dissimilarity was much greater. When asked what colors they saw, the dichromatics answered, as was expected, that the red was red, and the yellow yellow.

2. I then made the red lighter until, for my eye, it was equivalent to yellow. The deuteranope said, as I expected, that both fields were yellow. At that time I could not examine any protanopes, but, as I now know, they would have called this yellow yellow, and this red either red or green. For them the red is darker than the yellow, and the dichromatic person suspects, in such cases, that two different colors are presented to him, and he therefore names two different colors, while in reality both fields appear to him as different intensities of the same color.

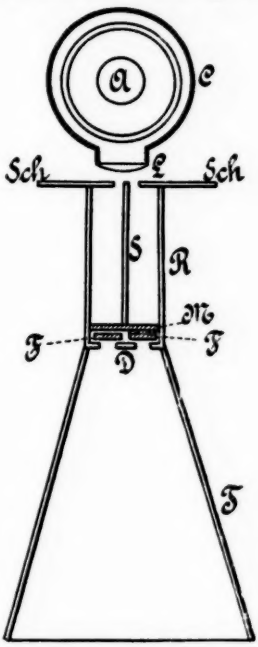
3. I now made for the protanopes an equivalency by making the red five times lighter. Now, the deuteranope always called the yellow red, and the red yellow, supposing that I had merely reversed the first order, the field which now appeared darker being called red. The protanope regarded the colors as equivalent in this third arrangement, although he said that one field was slightly lighter than the other; he did not speak of any difference in color.

With these three arrangements the diagnosis is assured.

The normal-sighted person, of course, regards none of these arrangements as equivalent. Even persons with greatly reduced perception of color differences never hesitate to call the red field red, and the yellow yellow, no matter which is lighter.

For practical purposes a very simple instrument may be

used. I found that sufficiently equivalent small fields could be obtained when a red and a yellow glass were placed before an Auer burner, and suitable smoked glasses then placed over the yellow. An apparatus devised on this principle was made by Elbo, at Freiburg (at a cost of twenty-five to thirty marks, including the burner). A horizontal section of the instrument is shown in the figure. A is an Auer



burner inclosed in a metallic cylinder, c, in which is mounted a plano-convex lens, L. The rays collected by the lens pass into the tube R, which is divided by a vertical partition, S. At its proximal end are adjustable screens, Sch, and at its distal end a piece of ground glass, M. Beyond this is a tin funnel, T, blackened on its inner surface. At the smaller end of the funnel is a diaphragm of blackened tin with two semicircular openings 1 *cm* high. Through these openings one sees the illuminated ground glass, behind which may be slipped pieces of colored glass, F, F.

The ground glass serves to give a uniformly luminous field behind the semicircular colored fields, whatever may be the arrangement of the screens. The screens make it possible to alter the luminosity of either color field independently of the other. The colored strips of glass usually employed are one of light-red ruby glass and one of yellowish orange darkened with a smoked glass which is cemented to it.

With this apparatus the test is made as follows when it is a question of determining as quickly as possible whether the patient has a dichromatic or a trichromatic sense:

(*a*) I put a red glass in each side, and open the slit *ad maximum* on one side and but slightly on the other, so that one field appears a dark red and the other a luminous bright red.

The patient sits at a distance of 2 *m* from the end of the instrument, and the question is asked: What colors are seen?

The trichromatic person answers: Light red and dark red. The deuteranope answers: Yellow and red, or yellow and green. The protanope answers: Red and green, or red and dark.

(*b*) I push the other diaphragm in until the two color fields are equally luminous.

Question: Are the two fields alike?

The trichromatic person answers: Yes.

The dichromatic: Yes, although the luminosity of the two will not appear exactly the same in all cases.

(*c*) I replace one red glass by a yellow glass darkened with a smoked glass, open the slit for the red *ad maximum* and that for the yellow only to a point marked II (here there is equivalency for the deuteranope).

Question: What is the color now?

The trichromatic answers: Red and yellow; or, red and brown; or, red and whitish; or, red and green.

The deuteranope answers: Yellow (one lighter than the other); or, both alike.

The protanope answers: one is darker than the other; or, yellow and green; or, red and green; or, yellow and red (reversing the two).

The deuteranope is now recognized. For the more accurate diagnosing of the protanope I proceed as follows:

(*d*) The diaphragm behind the yellow is now pushed in to mark I (equivalency for the protanope), and the question is put: Are both alike now?

The trichromatic answers: No (the yellow is darker, more or less brownish).

The protanope answers: Both are alike now.

The entire test is completed in a minute or less, except in the case of trichromatic persons with a greatly reduced color-sense.

The purpose which I have in making these four arrangements, *a–d*, may be explained briefly as follows:

In *a* (light red and dark red) I am acting on the experience that all dichromatics, when two such fields of unequivalent luminosity are presented, believe that one is testing their color-sense, and the unequivalency of luminosity is regarded as unequivalency of color. The answer is therefore false, and almost all dichromatic persons reveal their color defect by this first answer.

In *b* (two equivalent red fields) the intention is to show to the patient that equivalent combinations are actually brought about. The dichromatic person, who is very particular about noticing slight differences of luminosity, here gains the impression of equivalency, and is therefore less likely to doubt the apparent equivalency of the red-yellow arrangement which is used in *c*. Here the deuteranope states that both fields appear yellow, if the relations of luminosity are right. The protanope usually betrays himself in this test, and always in *d*.

The procedure may of course be varied in many ways. That given above is the most convenient for examining great numbers of persons.

VII—RESULTS OF THE EXAMINATION OF NUMBERS OF SCHOLARS AND SOLDIERS.

In order to determine the value of my method of testing for color-blindness, I thought it advisable to undertake extensive tests. Therefore, 1322 scholars in 3 schools were examined, among whom 23 deuteranopes were found, and

11 protanopes; and 1420 soldiers were examined, among whom 30 deuteranopes were found, and 23 protanopes. The total figures give a percentage of 3.17 % of dichromatics (1.9 % deuteranopes, and 1.3 % protanopes). Taken together with the 20 cases reported by v. Kries, this differentiation of type has been brought out in 107 dichromatic persons.

One advantage of my method is that school children of the lowest classes could be examined as easily as older persons; also, simulation was readily detected.

VIII—COMPARATIVE INVESTIGATIONS OF THE RESULTS OBTAINED WITH HOLMGREN'S TEST AND MY OWN.

(*Experiences with cases of incomplete color-blindness and reduced color-sense.*)

Double tests were carried out in the following way, the material consisting of an infantry regiment: I examined each man first by my method, and then Dr. Bibler carried out the Holmgren test. Of the 1420 men examined, the worsted test revealed only one more person with dichromatic color-perception than I had found with my test, and this error could not properly be attributed to the method. One day, feeling ill, I had tried shortening the test, using only two comparisons, and in this way one protanope was overlooked.

On the other hand, the worsted test apparently showed many persons to be dichromatic when more detailed examinations by various methods, including the use of the spectroscope, showed that they had in reality a trichromatic color-sense, but a more or less reduced power of discrimination between colors. With my pseudo-isochromatic charts the persons with reduced power of discrimination revealed their defect very readily, while they still showed that they had specific perceptions of red and green.

In 39 cases out of 1420, the worsted tests apparently showed the person to be a protanope or deuteranope, when in fact he was not. If these cases are included, the percentage of color-blindness among the soldiers was 6.48 %; omitting these cases it was 3.73 %.

The peculiarity of the color-sense in these persons is undoubtedly a weakened perception of color in the greater portion of the visual field, while at the fovea colors are fairly well differentiated. Both of my tests deal with the color-sense of a relatively small central area of the retina. It should be remembered that railway and marine employés require good color-perception only in the central portion of the retina, when it is a question of recognizing distant lights or flags.

It is remarkable, and not readily explainable, that those persons with reduced color-sense, in judging of large colored areas, are guided rather by their reduced color-sense in the peripheric and paracentral portions of the retina than by their more accurate color-sense at the fovea, and thus confound the test worsteds, which in fact are of more saturated color than my charts.

I do not wish to discuss this question further, as Holmgren's conception of incomplete color-blindness is obscured by the many typographical errors in his book. I quite agree with him, however, in believing that reduction of the color-sense may vary greatly in degree, from a slight disturbance which can scarcely be made out, up to one so considerable that most tests would show it to be true color-blindness.

In fact, however, the last-mentioned form is sharply distinguished from a dichromatic color-system by the existence of a third component making the color-system trichromatic.

I wish to state in conclusion that I regard it unjust to consider as color-blind all those who make mistakes with the worsted tests, and to refuse them employment in the marine and railway service. Holmgren's test is not a reliable one for determining the ability of a person to recognize colored lights and flags. In my opinion, tests for this purpose should deal with the color-sense of the fovea alone, or with the immediately adjacent central portion of the retina. My own test for this purpose is done with a blackened disc 10 *cm* in diameter, with a ring of perforations 1 *mm* in diameter, covered with bits of glass of various colors, and illuminated by an Auer's burner behind it. This is viewed from a distance of 1 or 1.5 *m*, and as the different colors are brought before

the light the person is required to name them. The dichromatic person, viewing such an isolated point of light and having nothing to compare it with, is quite helpless, and blunders greatly in naming the colors. Gray is usually called green; and dark orange, red, and yellow-green appear alike to him. The person with reduced color-perception makes mistakes as well. He calls light-blue green, and saturated green blue, but he distinguishes readily yellow-green, red, and yellow, and he distinguishes gray and green also.

In a series of cases in which the diagnosis as determined by Holmgren's method did not agree with that determined by my color apparatus and charts, this method of the luminous points always confirmed my diagnosis, and persons whom my tests showed to be dichromatic always exhibited the typical blunders when examined by means of the luminous points.

It is my intention to undertake further experiments for the purpose of determining exactly the status of persons with reduced color-perception as regards the recognition of signals, whether they are to be classed as color-blind or as having sufficient color-perception for the recognition of signals.

GLAUCOMA AFTER NEURO-RETINITIS ALBUMINURICA. A CONTRIBUTION TO THE PATHOLOGICAL ANATOMY OF GLAUCOMA.

By Dr. EUGENE WEHRLI,

ASSISTANT TO THE EYE CLINIC AT BERNE.

(*With Plates A—D of Vol. XXXVII.*, 1898, *German Edition.*)

Abridged Translation by Dr. Ward A. Holden.

INTRODUCTION.

THE clinical picture and the pathological changes found in albuminuric retinitis have been accurately studied and the pathology is sufficiently well known. Somewhat less numerous are the pathological papers on simple hemorrhagic glaucoma, but its pathology has been so far studied that anything new is not easily to be found. All authors agree that the ocular changes in albuminuria differ from the retinitis hemorrhagica due to senility and arterio-sclerosis not only as regards the stellate figure at the macula, but also as regards the papillitis that may appear with or without hemorrhages, and the fatty degenerations. The two diseases are therefore described independently in the text-books, and, when such a separation of the diseases is made, the complications of each fundamental disease seem worthy of separate study and investigation.

When the etiology plays so important a role in the pathology as is the case with retinitis albuminurica, the interest in the affections accompanying it will be so much the greater, and having recently seen two cases of retinitis albuminurica

complicated with glaucoma, it seemed to me worth while to study carefully the changes in the two enucleated eyes, because this complication, although recognized, has not had much attention paid to it. The first case is the more interesting since the retinal affection was unilateral, while in the other patient, a man of thirty-seven, there were new formations in the vitreous, suggesting retinitis proliferans (MANZ).

My thanks are due to Prof. Pflueger for allowing me to use the specimens and the clinical histories, and to Dr. Siegrist for making the drawings and rendering me other assistance.

RÉSUMÉ OF THE LITERATURE.

The reports of the outbreak of glaucoma in eyes with retinitis albuminurica are quite rare. In most of the text-books, no mention is made of this complication, nor is it spoken of in Graefe-Saemisch.[1] In mentioning the affections which may lead to secondary glaucoma, the following passage occurs: "When hemorrhagic processes in the retina are of long duration, yellowish white plaques may appear at the site of the old foci, resembling those seen in albuminuric retinitis."

In a similar way Stellwag[2] says that the retinal hemorrhages may soon become combined with symptoms of retinal inflammation, which, with the marked cloudiness and the focal exudations may resemble the picture of nephritic neuro-retinitis. That there may be a complicating acute glaucoma is not mentioned.

Panas[3] merely cites the case reported by Weeks, which will be alluded to later.

Michel[4] alone states that the changes of the vessel walls in the iris when there is glaucoma are worthy of attention because sometimes glaucoma may come on in cases of contracted kidney, frequently simultaneously with a so-called albuminuric neuro-retinitis, or in the course of such a retinitis, being then due to hyaline changes in the walls of the vessels in the iris and retina.

The following cases have been reported:

In a short note Graefe [6] stated that in all the cases of retinal affection accompanying albuminuria that had come under his notice, glaucoma had occurred in but one, and in this case the glaucoma appeared to be due not to the nephritis, but to an atrophy of the kidney dependent upon arteriosclerosis.

Hutchinson [8] reported the first microscopic examination. The left eye of a man of forty-five, which had become blind from albuminuric retinitis some weeks before, showed signs of acute glaucoma, such as pain and increased tension. In the enucleated eye white patches and hemorrhages were found in the macular region. The patient had been treated in a hospital for chronic interstitial nephritis. The right eye remained normal. After the enucleation the general condition improved, the albumen disappeared from the urine, and the patient was discharged apparently cured.

In a collection of twenty-nine cases of primary glaucoma uncomplicated with hemorrhage, Brailey [7] found one case with optic neuritis and albumen in the urine. Microscopically there were found some atrophy of the ciliary body with signs of inflammation, peripheric adhesions of the iris, blocking of Schlemm's canal, dilatation of the ciliary vessels, inflammation of the optic nerves, thickening and hyaline degeneration of the retina, and slight episcleritis.

In the same paper the author describes twenty-one cases of glaucoma with hemorrhages in the retina. One patient, a woman of fifty-three, suffered from albuminuria, and had been blind in the left eye for three months from glaucoma and hemorrhage. Iridectomy had been made up and down, then sclerotomy without result, and finally enucleation. Microscopically there were found moderate atrophy of the ciliary muscle, inflammation and peripheric adhesions of the iris, closure of Schlemm's canal, no dilatation of the ciliary vessels, inflammation of the ciliary body, and nothing unusual in the arteries of the retina.

Pagenstecher [9] reported the case of a woman of fifty-six with contracted kidney, who became blind quickly from glaucoma two years before her death. The right eye was phthisical, with staphylomata and detachment of the retina.

In the left eye there were also hemorrhages, and hyaline degeneration of the vessels in the retina.

Schnabel's[9] paper on glaucoma contains a description of a case of acute glaucoma in an eye with albuminuric retinitis and hemorrhages, which was successfully treated by iridectomy. A woman of fifty with œdema and hypertrophy of the left ventricle, due to nephritis, lost the sight from a hemorrhage into the vitreous, and two months later symptoms of glaucoma appeared that were relieved by iridectomy. There was no excavation. The diagnosis of chronic nephritis was confirmed at the autopsy made three months after the outbreak of the glaucoma.

The iris was adherent to the cornea at the periphery, the canal of Schlemm was normal, the ciliary body was distorted, the iris drawn into the operation wound, and the ciliary muscle was atrophic, but the ciliary processes were normal. In all layers of the retina there were hemorrhages and the nerve-fibre and ganglion-cell layers were highly atrophic. The disc was swollen, and the vitreous contained groups of red blood corpuscles.

Weeks[10] in his paper on albuminuric retinitis described among five other cases one with glaucoma. This case is interesting because, as in Hutchinson's case and my second one, there was unilateral albuminuric neuro-retinitis with hemorrhages, which, two months later, became complicated with acute glaucoma. There was hemorrhage into the vitreous and the tension was + 2. The eye was enucleated. The other eye was normal in every respect. The urine contained quantities of albumen, and granular and hyaline casts left no doubt as to the general disease.

Microscopically there were small blood-vessels in the cornea, the iris was thickened and compressed against the cornea at its periphery. In the anterior chamber there was a fibrinous exudation with a few white and red blood corpuscles. In the vitreous there were extensive hemorrhages and large branched cells. The retina showed the most advanced changes. The limitans interna was thickened and at some points broken through by hemorrhages. The nerve-fibres were swollen and the ganglion cells were swollen and

degenerated. The disc was excavated. The intima and media of the arteries had undergone a hyaline thickening, which at some places obliterated the lumen. The veins were large and distended with blood. The vessels of the iris, ciliary body, and choroid were in a similar condition. In the choroid the chorio-capillaris was obliterated.

Landsberg[11] reports two cases of glaucoma with albuminuric retinitis with microscopical examination, the condition having been permanently cured in both by iridectomy.

REPORT OF NEW CASES.

CASE 1.—August 29, 1895. G. M., a laborer of thirty-seven, was admitted to the hospital with the diagnosis: Right, nearly absolute glaucoma; left, albuminuric retinitis.

On July 10th the right eye became red and painful, and there was pain in the right side of the forehead. Atropine was prescribed and cold applications. The eye soon became blind and then eserine was prescribed by his physician.

On admission he was found to be small and poorly nourished, pulse regular but hard, breathing normal. Palpation and auscultation revealed nothing abnormal. The blood was normal, there was no indication of syphilis, but the urine had a specific gravity of 1,030 and contained albumen.

In the right eye there was moderate conjunctival and pronounced deep circumcorneal injection; pupil large, irregular, and irresponsive to light; iris hyperæmic, cornea diffusely cloudy, no details of the fundus recognizable, uncertain fixation to the temporal side, T+2.

The left eye was normal externally and with the correcting + glass had normal vision. Ophthalmoscopically there was a low grade of neuritis with some small hemorrhages and yellowish patches in the periphery of the retina, and a slight general œdema (see Plate A).

Eserine was used and the patient was put on a milk diet.

September 3d. The pain in the right eye continued, and at the patient's request the eye was enucleated.

September 23d. The general condition had improved and the patient was discharged.

October 31st. No albumen, s. g. 1,027. In the left eye some blurring of the disc margins and some fresh hemorrhages.

July 27, 1896. He was admitted to the hospital with the diagnosis retinitis proliferans. For three weeks the patient had suffered from severe headaches with some pain in the eye, and colored spots in the field of vision. V = 0.35, and a defect was found in the temporal portion of the field.

Ophthalmoscopically the margins of the disc are blurred and the disc appears to be surrounded by a grayish wall over which the vessels arch (Plate B). From near the nasal margin of the disc a gray elevation runs out toward the periphery and ends in two curved points. A small round elevation was found beneath the one already described and a third lay along the temporal branch of the inferior nasal vein. The hemorrhages had disappeared, but their previous site was marked by patches of pigment. The entire fundus was diffusely veiled.

Salicylic acid and diaphoretics were employed and the patient was soon discharged, his condition remaining unchanged.

August 30, 1897. He was admitted again after stating that his vision had failed considerably within the last few weeks.

Externally the eye appeared normal, the anterior chamber shallow, the pupillary reaction normal. In the vitreous were numerous opacities obscuring the fundus. Tension+1, V = fingers at 3 feet, field of vision not much restricted.

In the urine there was some albumen but no casts. The patient was soon discharged without any improvement in his eye.

MICROSCOPIC EXAMINATION.

The enucleated glaucomatous eye was hardened in Müller's fluid for two months and then in alcohols of increasing strength, imbedded in celloidin, and cut in vertical sections which were stained with alum-hematoxylin, and eosin.

The cornea, which normally is 0.9 *mm* thick,[19] was here 0.79 *mm* thick in its central portion and between the lamellæ there were numerous small empty spaces. From the limbus many small blood-vessels ran into the cornea for a short distance both in the superficial and deep layers, and toward the centre of the cornea there were many small hemorrhages. The basal cells of the epithelial layer were irregular and oblique and at some points separated by the presence of leucocytes. The epithelium was somewhat thinner than

normal, measuring 0.026 *mm* instead of 0.03.[19] The membranes of Bowman and Descemet were normal, and the endothelium on the latter showed no changes except where the iris lay in apposition to it.

The conjunctiva and episcleral tissue were loosened and contained foci of leucocytes and dilated blood-vessels.

The sclera, 0.39 *mm* thick at the equator, showed some round cells in its superficial layers. On the whole it was fairly normal, although a little thinner than usual.

The angle of the anterior chamber was occluded in its entire circumference. The iris was closely united with the ligamentum pectinatum and with the periphery of Descemet's membrane, in all over a distance of 1.8 – 1.9 *mm.*

The canal of Schlemm was entirely obliterated in nearly its entire extent. The iris was atrophic and greatly thinned. Its direction and relations to the ciliary body were greatly changed at its periphery by its adhesion to the cornea and sclera. The pigment epithelium and a portion of the sphincter muscle were partly everted at the pupillary margin. The iris was greatly changed in structure, an increased number of connective-tissue cells being present, and the loose, spongy tissue being transformed into a dense fibrous structure. The pigment epithelium was normal.

The anterior chamber was filled with a close network of fine fibres due to the coagulation of a fibrinous aqueous humor. In this network were many cells similar to the endothelioid cells found in granulation tissue, some of them containing pigment. No red blood corpuscles were found.

The posterior chamber was filled with the same material as the anterior.

The ciliary muscle was slightly atrophic and flattened against the sclera, losing its triangular form. The ciliary processes were normal, as were the zonula fibres.

The vitreous was very fibrillar, and posteriorly it was detached in some places by fibrinous masses transuded from the retina. It contained many scattered red blood corpuscles and many foci of corpuscles, particularly near the ora serrata. Besides the red blood corpuscles there were numbers of leucocytes in the vitreous, some small and some

large; and in the neighborhood of the hemorrhages were masses of organized tissue composed of spindle cells and a finely fibrillar material.

The choroid was of normal thickness. Anteriorly it was detached from the sclera. In the equatorial region there was a local hyperæmia, while elsewhere the larger vessels were mostly collapsed. In the posterior portion, in the regions where there had been extensive pathological processes in the retina, there were accumulations of leucocytes.

The lamina vitrea was thickened but intact.

The retina was attached to the choroid only at the ora serrata and about the disc. Everywhere else it was detached and slightly elevated, a change due no doubt to the process of preparation.

The retina was the part which had suffered the more extensive changes and no layer of it was free from alterations. Numerous small hemorrhages lay among the ganglion cells and the nerve fibres, but more were found in the nuclear layers.

At the upper temporal margin of the macula a large hemorrhage had spread out, destroying the outer reticular layer and at one point breaking through the outer nuclear layer and destroying the rods and cones. It sent a process between the pigment epithelium and the outer nuclear layer to the middle of the fovea (Plate D, Fig. 2, 6), where there were two small organized hemorrhages in the outer reticular layer (Plate D, Fig. 2, 5). These latter consisted of an irregular confused mass of spindle cells among which lay amorphous masses of blood pigment. No intercellular substance could be made out. An analogous formation, in the same location, but somewhat smaller, occupied the lower margin of the fovea and was connected with the large hemorrhage by a continuous band of red blood corpuscles (Plate D, Fig. 2).

Two small masses lay a little distance from the fovea, but still in the macula. The structure of all these masses was entirely similar, and in all probability they represented small organized hemorrhages in the fovea and macula, being distinguished by their pigmentation and by their connection

with unquestionable hemorrhages. Ophthalmoscopically they would have appeared as small round reflecting yellow spots.

From the fact that only a small portion of the hemorrhages were organized, it seems probable that this represents an older process and that the unorganized hemorrhages were of later date.

For the better understanding of the further pathological processes in the macular region, a short description of the degeneration of the retinal vessels will here be given, a more detailed description following later. The vessels showed a pronounced tendency to cell proliferation, and there was a tendency to an inflammatory hyperplastic proliferation of cells in the neighboring parts. The walls of the larger vessels often extend to the outer nuclear layer, while the normal retinal vessels are limited to the nerve-fibre layer or at the most to the inner nuclear layer. Excentric thickenings of the vessels were frequent (Plate D, Fig. 1); and a continuous series of sections showed that these thickenings presented first outward and then inward, the vessel wall becoming thicker and the lumen smaller until finally the vessel was represented merely by a solid connective-tissue strand. This process may be hastened by the formation of thrombi. Extravasation of blood into the neighboring parts is then very frequent.

About the vessels at the upper margin of the yellow spot there were proliferations of tissue, growing thicker and denser as the vessels neared the disc, until the entire structure of the inner layers was altered and distorted by these connective-tissue masses (Plate D, Fig. 1, 9).

The pigment epithelium had taken part in the general proliferation and masses of new atypical epithelial cells projected in as far as the middle of the retina.

From the new connective tissue about the macular vessels, new tissue spread not only outward through the retina but also inward toward the vitreous. Thus there was formed a flat ribbon-like membrane along the upper and lower margins of the macula corresponding to the connective tissue in the retina itself. The structure of this membrane was as

follows (Pl. D, Fig. 1): The portion next the vitreous consisted of a layer of long spindle cells, one to three strata deep. Beneath this was a thin layer of very cellular connective tissue (a1), with little intercellular substance and numerous thin-walled capillary vessels (a 10). Beneath this was a broader layer of finely fibrillar, almost homogeneous, ground-substance (a 2), with a few oval cells and larger vessels (7). Nowhere were traces of red blood corpuscles found.

The nasal half of the retina and the equatorial portions did not show such advanced changes as the temporal half. Small hemorrhages were found here and there and the walls of the vessels were thickened, but there were no characteristic organized hemorrhages as there were about the macula.

The connective-tissue stroma of the retina was greatly hypertrophied, and Müller's fibres were thickened.

The excavation of the disc was rather between the physiological and the pathological.

The arteries entering the ball, the anterior and posterior ciliary vessels, were absolutely normal, as were also the central vessels of the optic nerve and the arteries of the iris and choroid.

The most marked changes were found in the arteries and veins of the retina. In these arteries were found all stages of endarteritis chronica deformans with its results.

Besides the extensive membrane in the macular region, smaller connective-tissue excrescences projected from the nerve-fibre layer into the vitreous farther out in the periphery of the retina. These were all in connection with the adventitia of small arteries. This proliferation of the adventitia would correspond to periarteritis proliferans hyperplastica (Ziegler[4]) while the proliferation of the intima would be considered an endarteritis proliferans, each being a variety of arterio-sclerosis.

The consequences of these vascular degenerations are, narrowing and blocking of the vessel on the one hand and dilatation and rupture on the other.

The veins show the same tendency to proliferation as the

arteries and often are not to be distinguished from them. The capillaries of the retina were degenerated, there being at times an increase in nuclei and at others a homogeneous thickening of the wall.

REMARKS ON CASE I.

As to the etiology of the ocular changes, when all things are taken into consideration the symptom complex accords most accurately with the idea of an acute nephritis which had already passed its acme when the patient was admitted to our hospital.

Only a few words need be said in regard to the absence of the stellate figure at the macula, since it is generally known that the presence of this figure is not the rule. Schlesinger,[17] for example, found among 43 cases of nephritic changes in the retina, hemorrhages and cloudiness of the retina in 6 and blurring and prominence of the disc in 3.

Wadsworth [18] among 90 unselected cases found the stellate figure only twice.

It is worthy of note that in our case there developed in the left eye within three months whitish strands in connection with the vessels, arising from the plaques and extending out into the vitreous. At the same time pigment masses appeared in the peripheric foci, which it was evident from the microscopic finding in the other eye were formed of the pigment epithelium of the retina. The microscopic changes in the one eye corresponded to the ophthalmoscopic changes found in the other.

As to the prognosis for the second eye in simple non-albuminuric hemorrhagic retinitis, according to Mauthner [19] in one half the cases the second eye remains intact, in a quarter the same affection develops in the second eye without glaucoma, and in the remaining quarter hemorrhagic glaucoma some months later attacks the second eye.

Albuminuric retinitis may be recovered from even when it does not follow pregnancy or acute infectious diseases. Adamueck [20] reported such a case, and Michaelson [21] described a case in which there was recovery after hemorrhagic albuminuric retinitis had lasted for a long time.

Fürst[23] says: Albuminuric retinitis shares the bad prognosis of the contraction of the kidney to which it is due, yet it is certain that both affections may pass off and the ophthalmoscopic picture become normal.

I pass now to the pathological changes. The small parenchymatous hemorrhages at the corneal margin were doubtless due to injury to the ball in the course of the enucleation. Slight vascularization of the cornea is found in many pathological conditions. The cornea was slightly thinner than normal.

The angle of the anterior chamber was closed by the iris, which lay on the ligamentum pectinatum and membrane of Descemet for a distance of 2 *mm.* This adhesion of the iris, which Knies[32] used in support of the well-known theory of glaucoma, has been found in all the cases of glaucoma after albuminuric retinitis that have been reported (Brailey,[7] Schnabel,[8] Weeks[10]); it is also present in cases of simple hemorrhagic glaucoma (Brailey,[7] Birnbacher and Czermak,[34] Deutschmann,[35] Garnier,[36] and others), and in secondary glaucoma in general, although Valude[37] expressly states that blocking of the chamber-angle is absent in hemorrhagic glaucoma.

Schlemm's canal was almost wholly obliterated. The general atrophy of the iris reached its highest grade at the point of adhesion. The tissue of the iris had become fibrous instead of spongy. This condition of the iris, together with the sclerosis of the vessels, which is found in primary glaucoma, diminishes the amount of filtration in the iris; and upon these changes and a supposed consecutive disturbance of circulation with atrophy of the ciliary body and hypersecretion of the aqueous with increased tension, Ulrich[38] advanced his theory of glaucoma. Birnbacher and Czermak[34] were unable to confirm his findings, however, they finding only hypertrophy of the connective tissue of the iris vessels with special involvement of the adventitia, but no hyaline degeneration of the vessel walls in primary glaucoma.

The atrophy of the sphincter pupillæ may be due to atrophy of the nerves in consequence of the marked thinning of the iris at the periphery.

The ectropium of the pupillary margin of the iris which occurs in primary glaucoma is, according to Knies[33] and Birnbacher and Czermak,[34] the result of a contraction of the new connective-tissue membrane on the anterior surface of the iris, which was found also in our case.

All the layers of the retina contain capillary hemorrhages, and a more extensive one, partly organized, lies at the macula. The highly degenerated retinal vessels show a great tendency to hyperplastic cell proliferation, and with the hemorrhages tend to cause proliferation in the neighboring tissues. In the course of altered vessels at the upper and lower margins of the macula, which form connective-tissue strands, there is a band of connective tissue between the rods and cones and the pigment epithelium.

Deutschmann[35] described a formation of connective tissue in the same location in a case of hemorrhagic glaucoma, but as it contained remaining portions of elements of the blood he regarded it as an organized hemorrhage.

In our case neither blood pigment nor fibrin was present and the band showed little similarity to the organized hemorrhages in the fovea and at other places. This formation seems to me to have proceeded rather from the supporting tissue of the retina with which it is in direct relation and which is itself hyperplastic. The retinitis proliferans may at first stand in some relation to a hemorrhage which is becoming organized, or to a hyperplastic adventitia of the degenerated vessels in the neighborhood, but both Banholzer[36] and Goldzieher have reported cases in which the proliferation of Müller's fibres appeared to be the principal change.

Case 2.—S. L., aged fifty years, was admitted to the hospital July 13, 1893, with the diagnosis albuminuric neuro-retinitis. He was healthy until fifteen years before, when he began to have bleeding from the mouth, the origin of which was not determined. For ten years he has been very short of breath. Recently there had been bleeding from the nose also. For three years he has had transient attacks in which he lost consciousness.

He lived in poor circumstances. A diminution of vision in his left eye brought him to the hospital.

St. Pr.—A small man fairly fat, pulse tense, breathing difficult, no œdema, heart sounds normal. Urine: s. g. 1,018, daily quantity 1300 c. c., albumen and hyaline casts present.

Right fundus normal; left, excessive papillitis with large white plaques and hemorrhages about the disc, and plaques and tongue-shaped or punctate hemorrhages about the macula (Pl. C). L.V = movements of the hand.

Therapy: milk diet, warm baths, diaphoresis, and protecting glasses. Under this treatment the albumen and the casts decreased.

August 7th, the patient complained of severe headache on the left side, a pricking in the left eye and ear, and a sensation of pressure and cloudy vision in the left eye. Examination revealed marked circumcorneal injection, a diffuse haziness of the cornea, cloudy media, a pupil of medium size, and tension + 3.

Eserine relieved all the symptoms somewhat, but, August 11th, an iridectomy was made upward which led to considerable hemorrhage. August 14th, the tension was again increased. Slow course of healing. The anterior chamber was not restored until a week after the operation, atropine 2 % having been instilled once. This broke up the synechiæ in part and did not cause a relapse. Milk diet and eserine were continued. Later the eye became hard and painful and all vision was lost. October 18th, the eye was enucleated, no anæsthetic being used because of the marked arterio-sclerosis. The patient being very restless, the entire optic nerve with the papilla remained in the orbit, and the lens and vitreous were lost. The healing was uneventful. In June, 1894, the patient died of nephritis but no autopsy was made.

Microscopic Examination.—On account of the absence of some portions of the eye, the changes found will be described but briefly. The hardening, staining, etc. were as in Case 1.

The corneal epithelium is partly detached from Bowman's membrane and the basal cells are oblique. Schlemm's canal is of varying width, being wholly obliterated where the iris had healed into the scar. The iris rested on the ligamentum pectinatum and cornea for a distance of 1.62 *mm.* Its anterior surface is incompletely covered with a cellular exudation which is neither vascular nor fully organized. There are many foci of leucocytic infiltration in the iris, causing a considerable thickening.

The posterior chamber and the folds between the ciliary processes are filled with a network of fibrin containing large cells and red blood corpuscles.

In the choroid the vessels are all distended with blood, and here, as in the iris and ciliary body, there are many foci of leucocytes.

The retina is folded and detached and exhibits marked pathological changes. The most striking change is the presence of hemorrhages throughout all the layers of the retina. The inner layers are extensively disorganized, the ganglion cells and nerve fibres being degenerated and Müller's fibres hypertrophied, while many empty spaces indicate œdema. The nuclear layers are thickened and the rods and cones broken down.

The vascular changes are very marked. The vessels generally exhibit a chronic degeneration which is due to the general condition of the patient. The degeneration is furthest advanced in the arteries of large and medium calibre, the walls in some places consisting merely of hyaline tubes, while at other points irregular thickenings of the intima partly occlude the lumen.

The veins are large and distended with blood, and pathological changes are not evident.

The arteries of the choroid, ciliary body, and iris were more or less degenerated. The posterior and long ciliary arteries were thickened, and in some of the vortex veins the intima had proliferated.

REMARKS ON CASE II.

The unilateral appearance of albuminuric retinitis due to chronic nephritis is rare even when without complications. Yoert [44] described such a case in a patient who had but one kidney, which was affected with chronic parenchymatous nephritis. Schlesinger [17] reports a case that was under observation for two and a half years, Cheatham [45] reports two, Bull [46] ten cases, and Eales [47] one case.

Acute glaucoma following non-albuminuric neuritis or papillitis has been occasionally seen (Webster and Brailey,[48] Rampoldi,[49] and Mauro [50]).

The vascular changes have transformed the spongy structure of the iris into a fibrous structure as in Case 1. The ciliary body and choroid were in a state of chronic inflammation and contained many hemorrhages. All the layers of the thickened and œdematous retina were pervaded with hemorrhages—an expression of the advanced vascular degeneration. The nerve-fibre layer was atrophic and the supporting tissue hypertrophic. The pigment epithelium had undergone proliferation, and the rods and cones were degenerated.

The entire vascular system was in a state of advanced degeneration — a simple endarteritis chronica deformans, which is a frequent accompaniment of nephritic disease.

The two cases here described had in common pronounced degenerative changes in the vessel walls, which led, through partial thromboses, to hemorrhages in the retina and vitreous, followed by hemorrhagic glaucoma with closure of the chamber angle, atrophy of the iris, and endophlebitic processes in the venæ vorticosæ. In the first case, which was more advanced, the vascular degeneration assumed a more active character, giving rise to a proliferation of connective tissue in the retina and in the vitreous (retinitis proliferans). In the second case, on the contrary, the degenerative changes in the vessels were of a more passive character, the cellular proliferations acquiring only a limited extent before undergoing hyaline degeneration.

The genesis of hemorrhagic glaucoma has in recent times been brought into connection with thrombosis, particularly of the central vein (Purtscher, Marple, Fridenberg,[88] Weinbaum,[89] and Schnabel). In both of our cases there was thrombosis, but not of the central vein.

CONCLUSIONS.

1. It is known and also confirmed by the present investigation that kidney disease may cause changes in the vessel walls, which in their turn may lead to nutritive disturbances in tissues like the retina and there be objectively recognized.

2. Frequently kidney disease with albuminuria may exist without causing lesions in the retina.

3. It is proven that in a number of cases the ocular changes caused by kidney disease become complicated with symptoms of acute glaucoma.

4. It is therefore advisable in cases of glaucoma, even when retinal changes are wanting, to bear in mind the possibility of kidney disease.

LITERATURE.

1. *Graefe-Saemisch*, vol. i., p. 43.
2. STELLWAG, *Text-book*, 1882, p. 351.
3. PANAS, *Traité des maladies des yeux*, 1894, i., p. 638.
4. MICHEL, *Text-book*, 1884, p. 378.
5. GRAEFE, "Beitr. z. Path. u. Ther. des Glaucoms." *Graefe's Archiv*, xv., 3, p. 190.
6. J. HUTCHINSON, "Acute Glaucoma Supervening in an Eye Previously Lost by Retinitis from Renal Disease." *Royal London Ophth. Hosp. Reports*, 1866, vol. i., 5, p. 336.
7. W. A. BRAILEY, "Curator's Path. Report on the Morbid Anatomy of Glaucoma. *Ibid.*, vol. x.
8. PAGENSTECHER, "Beitr. z. path. Anat. d. Auges. *Graefe's Archiv*, vii., 1, p. 103.
9. SCHNABEL, "Beit. z. Lehre vom Glaucom." *Arch. f. Augenheilk.*, vii., 1, p. 103.
10. WEEKS, "A Contribution to the Pathology of Albuminuric Retinitis." These ARCHIVES, vol. xvii., 276.
11. LANDSBERG, "Glaucoma fulminans beiderseitig in einem Fall von Retinitis e morbo Brightii. *Hirschberg's Centr.*, 1884, p. 292.
12. *Graefe-Saemisch*, vol. i.
13. SCHWALBE, *Lehrbuch d. Anat. d. Sinnesorgane*, Erlangen, 1887.
14. ZIEGLER, *Lehrbuch d. spec. path. Anat.*, Jena, 1892.
15. EICHHORST, *Handbuch d. spec. Path. u. Ther.*
16. LEUBE, *Spec. Diagnose d. inneren Krankheiten.*
17. SCHLESINGER, "Beitr. z. Lehre v. d. Beziehungen d. Path. d. Netzhaut z. Morbus Brightii. *Inaug. Dissert.*, Berlin, 1884.
18. WADSWORTH, "On Albuminuric Retinitis." *Report of the Boston City Hospital*, 1877.
19. MAUTHNER, "Glaucomtheorien und Secundärglaucom," *Vorträge a. d. Gesammtgebiete d. Augenheilk.*, 10–11., p. 238.
20. ADAMUECK, "Ueber einen Fall von Retinitis hæmorrhagica alb. mit Ausgang in Genesung." *Hirschberg's Centr.*, 1889, p. 98.
21. MICHAELSON, "Ueber einen Fall von Retinitis hæm. alb. mit langjährigem Verlauf." *Hirschberg's Centr.*, 1888, p. 356.
22. FÜRST, "Beitr. z. d. Beziehungen zwischen Nieren- und Augenkrankheiten." *Berl. klin. Wochenschr.*, 1887, No. 18.
23. KNIES, "Ueber das Glaucom." *Graefe's Archiv*, xii., 3, p. 163.
24. BIRNBACHER and CZERMAK, "Beitr. z. Pathogenesis d. Glaucoms." *Graefe's Archiv*, xxxii., 2.

25. DEUTSCHMANN, *Beitr. z. Augenheilk.*, I, p. 33, 1890.

26. GARNIER, "Einiges über Glaucom und die damit zusammenhängenden Gefässveränderungen." *Arch. f. Augenheilk.*, XXV., p. 24.

27. VALUDE, "Contribution à l'étude du glaucome hémorrhagique." *Arch. d'opht.*, 1890, 3, 182.

28. ULRICH, "Studien über die Pathogenese des Glaucoms." *Graefe's Arch.*, XXV., 4, p. 235.

29. KNIES, "Ueber das Glaucom." *Ibid.*, xii., 3, p. 181.

30. DEUTSCHMANN, "Zur path. Anat. d. hæmor. Glaucoms." *Ibid.*, xxvi.

31. MANZ, "Anat. Untersuchung eines mit Retinitis proliferans behafteten Auges." *Ibid.*, xxvi., p. 71.

32. BANHOLZER, "Zur path. Anat. u. Pathogenese d. Retinitis proliferans." *Arch. f. Augenheilk.*, 1892, XXV., p. 186.

33. LEBER, *Graefe-Saemisch*, v., 2, p. 665.

34. SCHLEICH. "Ein Beitrag z. Entstehung d. spontanen Bindegewebsneubildung im Glaskörper." *Klin. Monatschr.*, xxviii., p. 63.

35. PRÖBSTING, "Ein Fall von Retinitis proliferans." *Ibid.*, p. 73.

36. AXENFELD, "Netzhautruptur bei einem Falle von Bindegewebsneubildung im Glaskörper und der Retina." *Arch. f. Augenheilk.*, xxvi., p. 225.

37. ALEXANDER, *Deutsche med. Wochenschr.*, 1885, No. 40.

38. SCHULTZE, "Entstehung der sogenannten Retinitis proliferans." *Arch. f. Augenheilk.*, XXV., p. 312.

39. MARTINET, *Deutsche med. Wochenschr.*, 1891, No. 9.

40. VAO DE LOAN, "Circo casos de retinite proliferante." *Period. de opht. prat.*, 5 and 6.

41. CARL THEODOR, "Ein Beitrag z. path. Anat. d. Auges bei Nierenleiden." Wiesbaden, 1887.

42. GRAEFE and SCHWEIGGER, "Beitr. z. anat. Klinik d. Augenkrankheiten." *Graefe's Archiv*, vi., 2, p. 277.

43. PAGENSTECHER, "Beitr. z. Lehre v. hæmorrhagischen Glaucom." *Graefe's Archiv*, xvii., p. 105.

44. YOERT, *Recueil d'opht.*

45. CHEATHAM, *Journ. Amer. Med. Assoc.*, v., p. 150, 1885.

46. BULL, *N. Y. Med. Journ.*, July, 1886.

47. EALES, "Un cas de retinite alb. de l'œil gauche seul." *Opht. Soc.*, Dec. 11, 1883.

48. WEBSTER and BRAILEY, "A Case of Glaucoma Preceded by Optic Neuritis, with Remarks." *Ophth. Hosp. Reports*, x., p. 205.

49. RAMPOLDI, "Ein bemerkenswerther Fall von Glaucoma mit vorhergehender neuritis optica." *Annali di ottalm.*, xi., p. 444.

50. MAURO, "Papillite e glaucoma." *Atti di R. acad. med. e chir. di Napoli*, xlvi., p. 250.

51. ARLT, *Zur Lehre vom Glaucom*, Vienna, 1884.

52. BRAILEY, "Zur Path. d. Glaucoms." Vorläufige Mittheilung. *Hirschberg*, 1879, p. 179.

53. STRAWBRIDGE, *Trans. Amer. Ophth. Soc.*, ii.

54. DENIG, "Anat. Befund bei spontan. entstandener Bindegewebsneubildung im Glaskörper." *Arch. f. Augenheilk.*, XXX., 4, p. 312.

55. PURTSCHER, "Beitr. z. Kenntniss d. spon. Bindegewebsbildung in

Netzhaut und Glaskörper." etc. *Arch. f. Augenheilk.*, xxxiii., Ergänzungsheft, p. 1.

56. GOLDZIEHER, "Ueber Retinitis proliferans." Twenty-fifth Congress at Heidelberg. *Arch. f. Augenheilk.*, xxxiii., 4, p. 444.

57. WÜRDEMANN, "Report of a Case of Thrombo-phlebitis of the Central Retinal Vessels, with Necropsy." These ARCHIVES, xxiii., p. 445.

58. FRIDENBERG, "Zur Path. d. hæmor. Glaucoms. *Arch. f. Augenheilk.*, xxxiv., 3, p. 185.

59. WEINBAUM, "Ein Fall von Glaucoma hæmor. mit Thrombose d. Vena centralis Retinæ und Ectropium Uveæ." *Graefe's Archiv*, xxxviii., 3, p. 191.

Explanation of the Figures.

Plate A, represents the beginning of the albuminuric neuro-retinitis with peripheric hemorrhages and disease of an artery running horizontally to the nasal side. (Left eye. Case 1.)

Plate B, represents a connective-tissue development in the vitreous, eight months later, proceeding from the vascular changes mentioned above. (Left eye. Case 1.)

Plate C, represents the pronounced neuro-retinitis of the left eye in Case 2.

Plate D, FIG. 1, represents a section through the degenerated retina *b*, with organized hemorrhages *c*, proliferation of the pigment epithelium *d*, endarteritis 8, periarteritis of a large vessel 9, new connective tissue in the vitreous *a*, which contains large vessels 7 and capillaries 10, and has a stratified structure 1 and 2. Zeiss obj. A. Oc. III.

Plate D, FIG. 2, exhibits two organized hemorrhages in the fovea beneath the unchanged pigment epithelium. Zeiss obj. A. Oc. III.

CLINICAL REPORTS OF TWO CASES.

By V. L. RAIA, M.D., Providence, R. I.

I. Extreme Deviation upward and outward of the Right Eye, with Nystagmus of the Left.

II. Transparent Floor of an Ulcer on a Large Leucoma of the Cornea.

I. G.C. Polish, twenty-three years of age, robust, healthy, and intelligent, with a family history not sufficiently clear to be of any avail, came to the Rhode Island Hospital in the winter of 1898 to see if anything could be done for an anomaly of his eyes, which had afflicted him as far back as he can remember. The patient showed a deviation upward and outward of the right eye and horizontal nystagmus of the left. The excursions of this latter were normal and free in all directions, pupillary reaction good, media transparent, color perception and field of vision normal, vision 0.9 with 0.50 D Hm. The right eye gave a peculiar appearance to the patient when he looked straight forward, only the white of the sclerotic being visible in the palpebral aperture. The cornea was completely hidden under the upper lid, and remained so even under the strongest efforts of the patient to look downward. Raising forcibly the superior lid, only the lower margin of the cornea could be seen, while a fixation forceps applied near the sclero-corneal junction did not materially move the eyeball from its abnormal position.

Cases of spasmodic deviation upward have been reported, but a permanent one in such a high degree as in our case, accompanied by nystagmus of the other eye, must be very rare, I having been unable to find any other in the medical literature of the subject. The troubles of both eyes were permanent, the patient having been under my observation

for about two months with the same abnormal manifestations.

It is generally admitted that vertical deviation is either due to paralysis of the depressors or levators, or to congenital absence of the muscles. In the present case I would exclude any congenital absence or abnormal implantation of the muscles in consideration of the nystagmus, which I consider not an independent disturbance, but etiologically associated with the trouble of the right eye. Nystagmus in general may be classified as *optic* and *neuropathic*, the former being the consequence of visual defects, the latter the result of central alterations. The left eye, as it appears from the history, is anatomically and physiologically normal and its trouble cannot but be neuropathic. The most plausible hypothesis then is that the deviation of the right eye is of the same nature. A central, localized disease has produced paralysis of the depressors and adductor (inferior rectus, superior oblique, internal rectus), followed by permanent contractures of the antagonists. A spasm of the levators and abductor (superior rectus, inferior oblique, external rectus) is out of the question, the trouble being not intermittent but permanent.

Considering the muscles that are affected and the absence of other brain symptoms, I deduce that the paralysis is of nuclear origin. In fact the partial nuclei of the internal rectus, inferior rectus, and that of the superior oblique are grouped together on the floor of the aqueduct of Sylvius, and it is easy to understand how an alteration might localize itself to these particular nuclei, leaving the others intact.

Although the pathology and etiology of nystagmus have not been sufficiently elucidated, Raehlmann and Charcot have proved that in some cases lesions of the fourth ventricle can produce it. Under such considerations then it is not improbable that both paralysis of the external muscles of the right eye and nystagmus of the left are the effect of the same cause—a localized, congenital disturbance on the floor of the fourth ventricle.

II. G. G., aged twenty-seven, Italian, four months previous to my first examination had gonorrhœal ophthalmia, for which he had

been once or twice to a dispensary in New York, afterwards taking no care whatever of his eyes. An ulceration of the cornea had taken place, leaving an extensive leucoma. The disfigurement of the eye becoming more evident every day decided him at last to consult a physician, and he came to me. At that time there was no secretion from the conjunctiva, all symptoms of inflammation gone, and on the cornea of the right eye a large leucoma of an irregular form was visible, leaving only the margin of the membrane transparent. On a line coinciding with the vertical meridian of the cornea there were two round ulcers, one above and the other below its centre, of which the former was smaller, opaque, and the latter larger (2 *mm* diam.), with a perfectly transparent floor. For three months that the patient remained under my observation the transparency remained stationary, and gave the appearance of a diminutive cornea implanted on the white scar. The floor of this ulcer, though somewhat convex, never, under the intraocular pressure, as is the ordinary case with keratocele, reached the level of the anterior surface of the cornea. Under artificial illumination, although the pupil could not be seen, the ulcer being small and eccentric, the iris appeared distinct in the lower part, free from adhesions to the cornea, and the anterior chamber of normal depth,—a fact which excludes the idea of corneal perforation.

Evidently in this case the stroma of the cornea had been destroyed throughout its entire thickness by the ulceration, leaving only the Descemet membrane intact, and when the reparative process had become complete a new ulcer had started, stopping its destructive effect at the deeper transparent structure.

Ulcers with transparent base, remaining as such for a long time, due to the great resistance of the Descemet membrane to inflammatory necrobiotic processes, are not rare, but a similar affection taking place on a recent, well formed leucoma with such peculiar characteristics cannot be common. It would have been interesting, if the ulcer, instead of being eccentric, with no qualitative light-perception to the patient, had been in the centre of the cornea, to note the amount of vision and the refraction of the affected eye.

THE PALPEBRAL REACTION OF THE PUPIL—(GALASSI).

By H. GIFFORD, M.D., Omaha, Neb.

THE pupillary reaction which I described in these Archives, June, 1895, as an orbicularis pupil-reaction has since been rediscovered by Westphal[1] and apparently also by Piltz,[2] who while mentioning my article claims the priority of the discovery for Wundt. This claim, however, is incorrect and is evidently made from a misconception of Wundt's language. That the reader may judge for himself I quote in full the passage referred to by Piltz: "Light stimulus regularly causes a double reflex: first, a closing of the eyelids with a turning of both eyes inwards and upwards; and, second, contraction of the pupil; both reflexes are bilateral, although when the stimulus is slight the movement is most marked on the stimulated side."[3] It is evident that the contraction of the pupil here referred to is simply the ordinary light-reaction, while in a foot-note to this sentence there occurs the following: "The closing of the eyelids is a reflex of the light stimulus to the facial; the contraction of the pupil and the rolling of the eye up and in, a reflex to the oculo-motor. All of these movements are at the same time instances of co-movement (Mitbewegung). When, for instance, we close the eye voluntarily, we at the same time turn the ball up and in; and when we make the latter movement then the pupil contracts at the same time." This plainly does not refer to the orbicularis contraction but to that which

[1] Westphal, *Neurologisches Centralblatt*, 1899, 4.

[2] Piltz, *ibid.*, 1899, 6.

[3] Wundt, *Grundzüge d. physiologischen Psychologie*, 1880, p. 172.

occurs when the eyes are turned up and in, and this is probably nothing but the convergence contraction. But having dismissed this claim of Piltz for Wundt, I can not do the same with that put forward by Mingazzini[1] for Galassi, for on looking up the references given by M. I find that Galassi described what I have called the orbicularis reaction not only before I described it in 1895 but before I had observed it in 1888. On June 11, 1887, Galassi[2] reported that he had observed a new pupil reflex in two women with oculo-motor paralysis. One of these, whom he exhibited to the society, had slightly dilated pupils, immovable to light and convergence stimuli, but if the patient closed the eyes firmly, while the right pupil remained immovable the left contracted sharply and dilated again when the orbicularis ceased its action. This led Bastianelli to examine the eyes of healthy people and he and Galassi found that often, if not always, a similar reflex could be observed in health. Then G. adds: "The experiment is difficult from the fact that, in health, the closure of the lids is accompanied by a rotation of the globe upwards by which the pupil is concealed from the observer. But if one makes the experiment with a person who can control this movement, one succeeds in most cases in seeing a contraction of the pupil which accompanies the effort of the orbicularis." He suggests that some cases of so-called perverse or paradoxical pupil-reaction are nothing more than this dilatation which occurs when the orbicularis ceases contraction.

In his second communication, G.[3] gives the history of a woman with right-sided unilateral oculo-motor paralysis, in whose right eye the light, convergence and accommodation reactions were absent, but who showed an exaggeration of the orbicularis reaction. She died soon after, and an examination of the third nerves showed a degenerative neuritis of the extradural portion of the right one, probably from the pressure of a slight exostosis at the base of the cranial cavity.

[1] Mingazzini, *Neurologisches Centralblatt*, 1899, 11.
[2] Galassi, *Bulletino della Soc. Lancis. degli Ospedali di Roma*, Anno vii., Fasc. iv., Seduta del 11 Giugno, 1887.
[3] Galassi, *ibid.*, Anno viii., Fasc. ii., p. 81.

To explain why this reaction may exist when all the ordinary pupil reflexes are gone, G. suggests that with the partly degenerated nerve it takes more of a stimulus than the ordinary reflexes furnish to overcome its resistance, and that this stimulus is furnished by the voluntary associate movement of the lids. To explain the exaggeration of the orbicularis reflex in this case, he supposes that from the condition of the nerves the sphincter was in a state of abnormal irritability, so that when the stimulus did reach it the muscle responded with an unusually sharp contraction. This he says actually takes place in some cases of paresis of the third nerve when the electric current is used; he regards it as a reaction of degeneration. The fact that this reflex may persist with peripheral lesions of the third nerve, when all other pupil reflexes are gone, may be used, he thinks, to differentiate between central and peripheral lesions. Galassi calls this reflex the palpebral reaction of the pupil, and as it may be a question whether "orbicularis reaction" is a better name for it, it seems to me that the former is the name it should go by; or, for short, the lid reaction.

In the article of Piltz above referred to, he describes as something new and distinct from the lid reaction a dilatation of the pupil which occurs after the lids have been closed firmly and then suddenly opened. This, it seems to me, is making two bites of a cherry. When the lid reflex is marked, the contraction of the pupil which occurs when the lids are closed tightly naturally gives place to a dilatation as soon as the contraction of the orbicularis ceases. This was indicated in my paper where, on page 396, I say: "Sometimes (when the lids are held forcibly open while the patient tries to close them) the eyes are rolled up so far that the pupil is not visible while the contraction of the orbicularis is going on, but as soon as the latter is relaxed and the pupils come down into view, they are seen for an instant to be contracted, though they dilate again promptly to the average or more than average size;" and for years before and since this paper was published I have been accustomed to illustrate the lid reaction by having the observer note that when the lids were opened, after a forcible closure, the pupil in many

cases dilates instead of contracting. This was also noted before me by Galassi, who was led by it to his conclusion that the so-called paradoxical reaction of the pupil was, in some cases, nothing more than a dilatation following a well marked lid reaction.

The only point of importance with regard to this reaction in which Galassi had not already anticipated me is the fact that although it is a reaction from the facial, it does not depend upon the reaction of all the fibres of the orbicularis, but chiefly or entirely upon the action of those which move the lids or perhaps simply the upper lid alone. Those parts of the orbicularis which pull down the eyebrow and pull up the cheek can be contracted with the utmost energy without having any effect upon the pupil, the contraction of which occurs most distinctly if the subject can direct his entire attention to contracting the strictly palbebral portions of the muscle. The difficulty which many people experience in doing this without practice accounts, in my opinion, for the impossibility of demonstrating the lid reaction in a certain proportion of normal eyes. Such subjects, when told to close the lids firmly, expend nearly all their energy in contracting the more peripheral (reckoning from the lid fissure as a centre) portions of the orbicularis, with little if any action of the lid portions of the muscle. Thus in the last 115 normal subjects whom I have tested for the lid reaction, I have been unable to demonstrate it in 16 cases, or about 13.8 %, and in all these cases it was impossible to get the subject to contract the lid portion of the orbicularis strongly.

If, as I have already suggested, the lid reaction of the pupil is explained by the fact demonstrated by Mendel in rabbits, that the orbicularis fibres of the facial arise, not from the common facial muscles but from the posterior part of the oculo-motor muscles, the facts just mentioned indicate that in man at least, it is only those fibres of the facial which supply the strictly palpebral portions of the orbicularis which have this oculo-motor origin. I have recently ascertained another fact which strongly indicates a separate origin for the different parts of the orbicularis muscle. It

has long been known that by forcibly closing the lids, many or perhaps all people can produce a rumbling or fluttering sensation in the ears, dependent upon a contraction of the stapedius muscle. I find that in my own case and in that of others whom I can get to perform the experiment intelligently, this noise can be produced only by contracting the strictly palpebral fibres of the orbicularis. The outlying fibres of the muscle can be contracted to the utmost without producing any sensation in the ears; but the instant the lid portions are brought strongly into action the rumbling begins.

Any one interested in this reaction can find a discussion of a few minor points, which I do not care to repeat here, in my former paper.

REPORT OF THE MEETING OF THE SECTION ON OPHTHALMOLOGY AND OTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE, HELD MONDAY EVENING, JANUARY 15, 1900.

By Dr. J. H. CLAIBORNE, Secretary.

Dr. Peter A. Callan, Chairman of the Section, and Dr. J. Herbert Claiborne, Secretary, were reëlected for the ensuing year.

Dr. Arthur N. Alling presented **a case of eyelash in the anterior chamber.** There had been an injury of the cornea of the left eye, resulting in leucoma adherens. There was also an injury of the lens. The eyelash could be seen distinctly in the anterior chamber attached to the leucoma. Dr. Alling thought the eyelash should be removed, and asked the opinion of those present.

Dr. Johnson referred to a case in which there had been a hair in the anterior chamber after injury to the lens. There had been no irritation. Cases were also referred to by gentlemen present in which bristles of a hair-brush had been driven into the anterior chamber. One case had been observed for three years and the eye was still quiet. Dr. Callan referred to a case in which a stone remained in the anterior chamber for twenty-five years. He thought the anterior chamber was quite tolerant of foreign bodies. In the case presented he thought the eyelash might be removed.

Dr. Percy Fridenberg demonstrated an instrument for testing simulated monocular blindness in malingerers. The instrument consisted of test-frames mounted upon a handle to which tilting mirrors were attached. The principle of the instrument consisted in deceiving the patient so that while he thought he saw with one eye he in reality saw with the other. The instrument was cleverly constructed.

Dr. Duane referred to a method by which the test might be

made without any apparatus, through the medium of red and black letters written on white paper and viewed with a red glass before one eye.

Dr. Fridenberg closed the discussion.

Dr. J. WILLIAM ATKINSON detailed a case of **sarcoma of the base of the brain involving the optic chiasm** in which there was a history of polyuria for three years; partial paralysis of the third nerve appeared in the right eye, and also diminished vision in both eyes. There was also a mild degree of optic neuritis in both eyes. The visual field began to contract from the temporal side, first in the right and then in the left eye. The left eye became blind three months and the right eye four months after the patient came under observation. The patient became gradually weaker and passed into a state of coma. He died eleven months after the first observation. Autopsy revealed a tumor in the region of the pituitary body, obliterating the optic chiasm and tracts. The tumor appeared to be a large round-celled sarcoma.

Dr. WILLIAM M. LESZYNSKY presented three **clinical cases illustrating lesions of the optic chiasm**. The clinical features of these cases were well set forth and numerous charts of the visual fields were presented.

A paper was read by Dr. WARD A. HOLDEN on **the sequence of changes in the optic chiasm produced by acromegaly, as exemplified in three cases.**[1]

In Case 1, the pituitary body was somewhat enlarged, and the chiasm slightly compressed from behind and below, and the optic tracts from within.

In Case 2, the pituitary body measured 3.3 *cm* in antero-posterior diameter, and 2.7 *cm* in transverse. It nearly filled the space included within the arterial circle of Willis. The atrophied optic nerves, flattened and distorted, emerged from between the pituitary body and the atheromatous anterior cerebral arteries. The only trace of chiasm remaining was a membranous band stretched over the anterior surface of the pituitary body from one optic nerve to the other.

In Case 3, the chiasm was flattened so that it occupied an area 2.5 *cm* square. The central portion, while not entirely atrophic, was greatly compressed, and was forced up against the base of the

[1] To appear, with illustrations, in the *Archives of Neurology and Psychopathology*, vol. ii., No. 3.

brain, while each optic nerve appeared to be continuous with the optic tract of the same side only. An atrophic process extended inward from each optic nerve, representing the anterior portion of the chiasm which had been cut through. The bony pituitary fossa was enormously enlarged, the anterior wall being pushed forward nearly to the line connecting the optic foramina.

Normally the anterior portion of the chiasm lies above the olivary process of the sphenoid bone. The infundibulum of the pituitary body passes down behind the chiasm and expands into the body proper, which fills the pituitary fossa, lying beneath the posterior portion of the chiasm. While the other relations remain normal, the upward pressure of an enlarged pituitary body can affect the chiasm in its posterior portion only. But with the pushing forward of the anterior wall of the fossa which eventually results from the enlargement of the pituitary body, the anterior portion of the chiasm loses the bony floor on which it has rested and then becomes subject to the encroachment of the pituitary body.

From an examination of these three cases it is evident that the gross changes which the chiasm may regularly be expected to undergo in acromegaly are these :

First, the enlarging pituitary body compresses the posterior portion of the chiasm. Following this, the posterior and middle portions of the chiasm are flattened and forced upward, thus becoming separated from the anterior portion, which is protected from pressure by the bone beneath it. Later, with this tilting upward of the chiasm posteriorly and the forcing forward of the anterior wall of the pituitary fossa, the anterior portion of the chiasm is encroached upon by the pituitary body and arched directly forward. Finally, the chiasm may be cut through completely.

The glandular enlargement of the pituitary body in acromegaly always remains within its capsule and never penetrates the chiasm as the malignant tumors of the pituitary body may do. Hence the pressure on the chiasm is diffuse, and the resulting degeneration in the chiasm need not be exactly at the seat of pressure. Furthermore this diffuse pressure may interfere with the function of large portions of the chiasm, but often only slightly, so that the defect in the visual field is not absolute, but for colors only.

There may be considerable variety in the type of contraction of the visual fields. If the pituitary body becomes enlarged

symmetrically, the chiasm will probably be compressed posteriorly and flattened out laterally. With diffuse pressure on the chiasm in its entire lateral extent there will probably be concentric contraction of the visual fields; but if the median portion of the chiasm is the more compressed, as is frequently the case, the crossed fibres in the chiasm will be those most interfered with, and there will result a more or less typical bitemporal hemianopsia.

If, however, one side of the pituitary body enlarges more rapidly than the other, for a time one tract alone may be compressed, causing homonymous hemianopsia.

Again, the atrophy in one optic nerve may differ from that in the other, because one has been pressed against a rigid anterior cerebral artery instead of against the soft brain substance.

Furthermore, Broca believed that the optic nerves might be compressed by narrowing of the optic foramina. In Case 3, the foramina were somewhat contracted, although there was no evidence of pressure upon the nerves, which were slightly atrophied.

Finally, in view of the fact that in acromegaly there are frequently signs of inflammation of the optic nerves, amounting at times to choked disc, the nerve fibres might be compressed as a result of interstitial inflammation. In none of these three cases, however, were microscopic signs of neuritis found.

About 200 cases of acromegaly have been reported. Disturbances of vision were noted in about half of them. In more than 50% of the cases with disturbance of vision there was found concentric contraction of the fields. In somewhat less than 50% there was bitemporal hemianopsia, absolute or for colors only, with or without some contraction of the nasal halves of the fields. In less than a dozen cases there was homonymous hemianopsia, and in one case there was found atypical binasal hemianopsia.

The type of contraction, of course, often changes as the disease progresses.

In the *discussion* of Dr. Holden's paper, Dr. H. KNAPP said that he could not speak on acromegaly, having had no cases of this disease under his care, but he had seen a good many cases of bitemporal hemianopsia. Out of these he would briefly detail three as worthy of particular notice; in two of them an autopsy had revealed sarcoma of the pituitary body.

Sarcoma of the hypophysis cerebri, bitemporal hemianopsia, total blindness; insanity, impotence from rudimentary development of genitals.

Case 1 was that of a well-built man of twenty-eight years, whom he had first seen in 1870, and who two months previously had noticed impairment of sight in the left eye, and temporary obscuration in both. The temporal half of the field of vision of the left eye was completely absent, cutting off sharply at the vertical meridian. The outer part of the F of the right was absent to a line running from near the vertical meridian obliquely down and outward. Both opd. pale.

May 17, 1871, bitemporal hemianopsia ending at vertical median plane. S R $\frac{20}{40}$, L $\frac{20}{70}$.

April 16, 1873. Both opd. atrophic. L S = 0; R temp. hemianopsia, encroaching on the nasal side, below more than above. S $\frac{20}{100}$. He lived five years longer. His chief complaint were visual hallucinations, the unreality of which he was conscious of, later he believed in their existence. He was drowsy, at times delirious, weak; stools involuntary. He became completely insane. The autopsy, made by Dr. E. G. Seguin, revealed a *tumor of the hypophysis cerebri.*

A peculiar symptom in his case, noticed before the beginning of his impairment of sight until his death, was *impotence* from rudimentary development of his genitals. He was married, but had no children.

Case 2 has many features in common with the previous one. **Bitemporal hemianopsia, gradually developed, leading to total blindness; well-built, stout woman with an involuted uterus.** She was married. In the fifth month of pregnancy was suddenly attacked with headache and left hemianæsthesia, beginning at the foot and lasting ten minutes. She was very well for a year, when, in winter, coming from the cold into a hot room, she had headache again, and for five minutes her right arm was insensible, not paralyzed. Two years later she had constant headache for some weeks, most in the forehead, next on the vertex, accompanied by dizziness and ringing in the ears. Since then her sight has gradually declined. Her menstruation did not return after her confinement, but she felt no discomfort in her abdomen.

Two years later she went to Germany, where Dr. Biedert discovered bitemporal hemianopsia, not quite reaching the median line in the right eye. She constantly had the sensation of pressure in her forehead.

I saw her first, May 29, 1880, four and one half years after she

had the first attack of hemianæsthesia. I found the complete picture of bitemporal hemianopsia, the limit exactly in the median line. S L $\frac{20}{40}$, R $\frac{20}{200}$. She had the peculiarity that in the blind left temporal half of F there were several small islets in which she could see a white ball 15 *mm* in diameter, on a black stick. The optic nerves were atrophic. On my advice she was examined by a gynecologist, who reported that she had an involuted uterus.

I saw her last twelve years later, March 5, 1892. She was free from pain, but had been totally blind the last ten years. No cerebral symptoms. Photopsiæ for ten years, phantasms and other cerebral symptoms for two months. Some time ago I heard that she was living, but blind as before.

The diagnosis of enlargement of the pituitary body can safely be admitted. Whether in the previous case, as in this one, and in one of Professor Oppenheimer's, the rudimentary genitals had any relation to the hypophysis disease or not I cannot tell.

Sarcoma of hypophysis, involving the optic chiasm and perforating the vault of the pharynx, temporal hemianopsia.

Case 3 referred to a girl of twelve years, whom I first saw in May, 1888, with incomplete **optic-nerve atrophy of the left eye.** S $\frac{20}{100}$. F contracted on temporal side. Right eye normal. Six months before she came to me she had struck the left side of her forehead against the edge of a door. She had no cerebral symptoms. Her sight gradually weakened.

January 13, 1891, S was R $\frac{20}{50}$, L $\frac{20}{200}$. Right eye color perception absent in temporal half, contracted on nasal side. While taking Ung. Hy. and KI her sight improved, R to $\frac{20}{30}$, L to $\frac{20}{100}$. Soon, however, it weakened again, and the fields contracted; the limitation in the left advanced considerably from the temporal over to the nasal side.

In March, 1891, F for forms complete, but objects appeared veiled, and colors were not recognized at all on the temporal side of the right eye. Line of demarcation in the vertical meridian. R S $\frac{20}{30}$, but cannot count fingers on the temporal side. In July, 1891, she had vomiting and convulsions, which disappeared quickly on bromides. She died August 4, 1891. Shortly before her death there was an escape of liquid through the posterior upper wall of the pharynx. She had been seen and occasionally treated by Drs. C. S. Bull, Hy. D. Noyes, E. C. Seguin, and E. G. Janeway.

At the autopsy I found a tumor (sarcoma) involving the optic chiasm, extending little to the right optic trunk, but considerably to the left. The hypophysis was merged into it. The sphenoidal sinus was perforated in its lower wall. This girl also was of strong build, but showed no conspicuous abnormity.

Whether the rudimentary condition of the genitals in the first two cases had a particular connection with temporal hemianopsia, hypophysis tumors, and acromegaly, I do not know. I have looked up the three cases, described above, in my record books, and desire to say that the last was mentioned by Dr. Noyes and myself at the twenty-seventh annual meeting of the American Ophthalmological Society (September 23, 1891, in Washington, D. C.), in the discussion of a paper by Dr. C. S. Bull, "On Intracranial Lesions, with Defects in the Visual Fields. Five Cases with Autopsies." *Trans. Am. Ophth. Soc.*, vol. vi., p. 268.

Dr. GRUENING referred to the case of a young girl, a student, who had dimness of vision one evening. She exhibited **blindness in the upper temporal quadrant** of the field of the left eye and paracentral scotoma of the right temporal field. She had headache and vomiting. The patient became blind. No marked neuritis.

Dr. JOSEPH COLLINS said that the **ocular symptoms of acromegaly were inconstant and variable, as was the lesion that produced them.** Although it was generally accepted that lesion of the pituitary gland stood in definite causative relationship to acromegaly, there is no unanimity of opinion as to what these changes really are,—they may be tumor formation, simple atrophy, or hypertrophy. In the cases that he had observed and which had come to autopsy there was lesion of the pituitary gland similar to that in the cases related by Dr. Holden.

He referred to Dr. Knapp's observation in regard to atrophy of the genital system in acromegaly. He had observed that in men the genitals were shrunken, while in women the internal genitals were shrunken and the external enlarged. He also referred to a case of psychic trauma, in which there was bitemporal hemianopsia. He thought that what might be called a field characteristic of acromegaly did not necessarily mean lesion of the chiasm. The man spoken of recovered under treatment.

Dr. KNAPP referred to Dr. Leszynsky's cases, and said that he likewise had observed islets of sight in the blind part of the field.

Dr. LESZYNSKY said he thought the fields ought to be taken

carefully. He had seen Dr. Atkinson's case, and had observed that the third nerve was involved on the same side as the lesion. He referred to the absence of neuritis and to the existence of bitemporal hemianopsia as classical symptoms in this class of cases. He referred to the possibility of these symptoms being caused by benign tumors, and said that it was not easy to make the diagnosis of malignant disease. He had made no inquiry as to the existence of rudimentary genitals.

Dr. HOLDEN, in closing the discussion, referred to the imperfect testing of the fields. He thought the fields should be tested with colors, or with pale-gray test objects.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE THIRD QUARTER OF THE YEAR 1899.

By Dr. ST. BERNHEIMER, in Vienna; Dr. O. BRECHT, Prof. R. GREEFF, Prof. C. HORSTMANN, and Dr. R. SCHWEIGGER, in Berlin;

WITH THE ASSISTANCE OF

Dr. G. Abelsdorff, Berlin; Dr. Swan M. Burnett, Washington; Dr. Dalén, Stockholm; Dr. Herrnheiser, Prague; Prof. Hirschmann, Charkow; Dr. Krahnstöver, Rome; Dr. P. von Mittelstädt, Metz; Prof. Da Gama Pinto, Lisbon; Dr. Sulzer, Paris; W. J. Lister, F.R.C.S., England; Dr. C. H. A. Westhoff, Amsterdam.

Translated by Dr. Ward A. Holden.

Sections I.–III. Reviewed by Prof. HORSTMANN.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

325. Birnbacher. The pathological histology of the human eye. Veit & Co., Leipsic, 1899. First part.

326. Borthen, Lyder. Lepra of the eye. Clinical studies with pathological examinations by N. P. Lie. Leipsic, 1899. Engelmann.

327. Magavly. Reports from the St. Petersburg Ophthalmic Institute. Vol vi. In celebration of the seventy-fifth year since the opening of the institute. St. Petersburg and Leipsic, 1899.

328. Pergens. Leonhard Fuchs's "*Alle Krankheyt der Augen* (1539), republished. *Centralbl. f. prakt. Augenheilk.*, xxxii., pp 197 and 231.

329. LEWITZKY. Report on the work done in the University Eye Clinic at Kieff in the fifteen years of its existence (1883–1897).

330. MULLEN, JOSEPH A. The percentage of color-blindness to normal color vision as computed from 308,919 cases. *Ophth. Record*, July, 1899.

331. EYE, EAR, NOSE, AND THROAT HOSPITAL OF NEW ORLEANS. Ninth annual report, 1898.

332. NEW YORK EYE AND EAR INFIRMARY REPORT, for the year ending October 1, 1898.

333. BELL, G. H. Summary of operations for cataract done at the New York Eye and Ear Infirmary from October 1, 1897, to October 1, 1898. *New York Eye and Ear Infirmary Report*, Jan., 1899.

The purpose of BIRNBACHER'S (325) work, which will appear in five parts, is to offer to the clinician accurate representations of the histological conditions found in the commoner forms of ocular disease. The first part comprises five plates of heliotype reproductions of photo-micographs illustrating the diseases of the conjunctiva. These unusually successful reproductions with explanatory text will prove very valuable for personal and class-room instruction.

Borthen (326), having studied lepra in five colonies, gives a comprehensive clinical description of the ocular complications, which is supplemented with pathological studies by Lie. The value of the book is considerably enhanced by the presence of seventeen figures in the text, and fifteen heliotype and nine chromo-lithographic plates, all well executed.

Magavly's (327) book gives a history, with various sorts of data, of the St. Petersburg Ophthalmic Institute. From 1824 to 1898, the number of out-patients was 756,784. The number of operations was 58,570, of which 7263 were for cataract.

HIRSCHMANN.

In Germany the opinion was general that German ophthalmology had its beginning in Bartsch's *Ophthalmodouleia* (1583). Pergens (328) found that L. Fuchs had published in 1539 a small book on the eye which was a German rendering of his *Tabula Oculorum Morbos Comprehendens* (1538, Tübingen). A résumé of its contents is presented in Pergens's paper.

The total number of out-patients treated in the clinic at Kieff

(329) was 34,060, with 2052 operations. The in-patients numbered 2532, and 2385 operations were done. HIRSCHMANN.

The statistics from which Mullen (330) computed his results were obtained principally from the Naval Departments of the various nations of the world. There were 308,919 men, and among these there was an average of 1.82% color-blind. Among 15,634 women the percentage was 0.01. As to nations, France had the least, 0.01%, and Denmark the highest, 3.80%. The United States had 1.53%, and England, 3.2%. Japan, 3.1%, and China, 3.16%. BURNETT.

In the eye department of the New Orleans Eye, Ear, Nose, and Throat Hospital, (331) under the charge of Dr. H. D. Bruns, there were treated, during 1898, 2356 cases. These cases have been tabulated after the custom of this hospital most carefully, and are a credit to the institution and of great value to the scientific student. We know of no such painstaking work anywhere. There were 25 extractions, 7 discissions, 15 enucleations, 33 iridectomies, 3 for glaucoma, 6 tenotomies, and one advancement. BURNETT.

During the year ending October 1, 1898, there were treated at the New York Eye and Ear Infirmary (332) 24,904 eye diseases. There were 271 operations of all kinds on the lens, 138 on the muscles, 138 on the iris, and 66 on the globe. Specific operation not given. BURNETT.

During the year ending October, 1898, there were made at the New York Eye and Ear Infirmary (333) 178 extractions of cataract. Of these, 90 were senile. The average stay in the hospital was 15.12 days. There were two cases of panophthalmitis, one preceded by hemorrhage into the vitreous. No source of infection for these was found. Intraocular hemorrhage occurred in one case following retinal detachment. There were 66% of simple extractions; 27% with iridectomy; linear, 2.25%. Discission of capsule was made in 18.56% of the cases. The iris prolapsed in 11.28% and generally twenty days after the operation. Ultimate vision $\frac{20}{10}$ or better in 34.13%; $\frac{20}{30}$, 26.82%; $\frac{20}{40}$, 21.95%; $\frac{20}{60}$ 12.19%; $\frac{20}{70}$, and $\frac{20}{200}$, each 2%. These cases are beautifully tabulated. BURNETT.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

334. VAN DUYSE. On congenital anophthalmus. *Arch. d'opht.*, xix., 7, p. 142.

335. HOPPE. Argyrosis: a clinico-anatomical investigation. *Graefe's Archiv*, xlviii., p. 660.

336. SIEGRIST. The danger to the human eye of ligating the common carotid. *Corr.-Blatt. f. Schweizer Aerzte*, 1899, No. 22.

337. LOBANOFF. The influence of the temperature of liquids on their absorption from the conjunctival sac. *Wratsch*, 1899, No. 35.

338. RICCHI. Bacteriological researches and brief clinical considerations in regard to some cases of lachrymal tumor. *Ann di Ottalm.*, xxviii., 1.

339. PES. Bacteriological note on the bacillus of the Meibomian secretion (Reymond-Collonatti) in its relation to conjunctival affections and its biological affinity with the Klebs-Loeffler bacillus. *Report of the XV. Italian.Ophthalmological Congress*, at Turin, 1899.

340. GULLSTRAND. On the meaning of dioptry. *Graefe's Archiv*, xlix., p. 46.

341. GOLDZIEHER. *Ocular Therapeutics;* 2d revised edition, 1st half. Leipsic: Veit & Co., 1899.

342. HERTEL. The effect of cold and warm applications upon the temperature of the eye. *Graefe's Archiv*, xlix., p. 125.

343. BAJARDI. On the penetration of mercury into the intraocular liquids from local applications of mercurial preparations. *Report of the XV. Italian Ophth. Congress*, at Turin, 1899.

344. FAGE. Antiseptic injections and lavage of the anterior chamber. *Arch. d'opht.*, xix., 7, p. 436.

345. GUTTMANN. On the employment of strong solutions of bichloride in ophthalmic therapy. *Deutsche med. Wochenschr.*, 1899, Therapeutic Supplement No. 11.

346. KOESTER. A statistical clinical report on 773 enucleations of the eyeball. *Inaug. Dissert.*, Tübingen, 1899.

347. HOOR. On the bactericidal and deep action of argentamin. *Centralbl. f. prakt. Augenheilk.*, xxiii., p. 225.

348. MAZZA. A new application of nitrate of silver. *Report of XV. Italian Ophth. Congress*, at Turin, 1899.

349. LANDOLT, H. On the use of extract of suprarenal capsule in ophthalmology. *Centralbl. f. prakt. Augenheilk.*, xxiii., p. 321.

350. BARKAN. A further contribution to the extraction of

particles of steel or iron with Haab's large electro-magnet. These ARCHIVES, xxviii., 3, p. 282.

351. DUNN, B. L. Eye strain in its relation to the vertical centration of lenses. *Ibid.*, 5, p. 488.

352. PYLE, WALTER L. Hydrophthalmos: a bibliographical, clinical, and pathological study. *Phila. Monthly Med. Journ.*, April, 1899; also *Annals of Ophth.*, July, 1899.

353. MARSHALL, DEVEREUX. Report of an eye having some congenital peculiarities. *Ophth. Hosp. Reports*, xv., part 1, May, 1899.

In the case reported by VAN DUYSE (334), an infant which died at the age of three months showed no trace of an eye, but the lids were fairly well developed in the vicinity of the lachrymal apparatus. On autopsy it was found that the orbit was normally formed except for an aplasia of the sphenoid bone corresponding to the optic foramen. Anteriorly the orbit was closed by the tarso-orbital fascia covered with conjunctiva, which in its central portion had a depression the size of a pinhead in which the duct of the lachrymal gland opened. There was no trace of a cornea. The eyeballs were reduced to structures 1 *mm* broad and 5 *mm* long, united by a fibrous end to the tarso-orbital fascia, and consisted of a fibrous sheath inclosing a choroid separated by pigment cells from a quantity of vessels which filled the cavity. The muscles were inserted into the tarso-orbital fascia. Optic nerve, chiasm, and tracts were completely wanting. The corpora geniculata were barely indicated, and only the posterior pair of the corpora quadrigemina were present. v. MITTELSTÄDT.

HOPPE (335) removed a 6-*mm*-square piece of conjunctiva and underlying conjunctiva from the lower lid of a patient with argyrosis after two years' use of nitrate of silver. On microscopic examination he found that the greater portion of the pigment was deposited in and among the elastic elements, while an unbroken layer of free pigment lay spread out under the epithelium. It was scattered like fine black dust among the vessels. According to Hoppe's view the pigmentation in argyrosis takes place from the solution having passed into the blood current.

SIEGRIST (336) observed two cases in which ligation of the common carotid led to blindness of the eye on the same side. This blindness came on without inflammatory symptoms, or indeed any manifest external symptoms whatever, but was due to

embolism of the central artery, as was demonstrated anatomically in one case, with or without secondary thrombosis of the ciliary arteries. The visual disturbances are not to be ascribed to the ligation of the carotid *per se*, but are complications due to pathological conditions elsewhere.

LOBANOFF'S (337) investigations were done by the colorimetric method of Bellarminoff, using fluorescin solutions. Higher temperatures (up to 50° C.) favor the passage of fluorescin into the anterior chamber. The increased diffusion (not the osmosis, according to the author's view) stands in fairly constant relation to the increase in temperature. Diminution of temperature diminishes diffusion. Perceptible scaling of epithelium was noticed only when the solutions used were heated above 50° C.

HIRSCHMANN.

After considering the observations of others, RICCHI (338) gives the results of his own examination in 13 cases of suppuration of the lachrymal sac ; 21 varieties of micro-organisms were isolated, actinomyces albus being repeatedly found. KRAHNSTÖVER.

PES (339) does not believe that the Reymond-Collonatti bacillus, commonly known as the xerosis bacillus, is the cause of xerosis, since it is occasionally found in the secretion of the glands at the free margin of the lid, and inoculation usually shows it to be innocent. It is in the class of bacilli similar to the diphtheria bacilli, which, however, differ only functionally from the true diphtheria bacilli. KRAHNSTÖVER.

The first half of GOLDZIEHER'S (341) valuable work treats of the therapy of the diseases of the conjunctiva, cornea, sclera, iris, and lens.

HERTEL'S (342) experiments showed that the temperature of the conjunctival sac was raised by warm applications and lowered by cold applications in equal measure whether the circulatory relations were normal or not, the resulting temperature depending in no way upon the effect of the applications upon vessels or nerves.

BAJARDI (343) asserts that he has by chemical means demonstrated the presence of mercury in thea queous humor after application of yellow-oxide salve in the conjunctival sac and after subconjunctival injections of sublimate 1:1000 or even 1:5000.

KRAHNSTÖVER.

FAGE (344) found that injections of 1:5000 oxycyanide of mercury into the anterior chamber of rabbits with keratitis from

inoculation were well borne. He then tried the injection of a solution of half this strength into the anterior chamber of human patients with hypopyon keratitis. The hypopyon soon disappeared and also the pain and symptoms of irritation, while the ulcer slowly improved and cauterization was not required. When there is excessive hypopyon and panophthalmitis threatens, the author, like St. Yves, advises washing out the anterior chamber.

v. MITTELSTÄDT.

GUTTMANN (345) obtained good results in acute conjunctival catarrh, trachoma, and blennorrhœa of the lachrymal sac by instilling 1:300 bichloride solution.

The 773 enucleations done in the Tübingen eye clinic were, according to KÖSTER (346), 53 for malignant tumors, 1 for cysticercus, 74 for glaucoma or hydrophthalmus, 3 for intraocular hemorrhage, 447 for injury, 5 for panophthalmitis, 45 for secondary glaucoma, 49 for irido-cyclitis, 50 for staphyloma, 33 for phthisis bulbi, 2 for Basedow's disease, and 1 for lagophthalmus.

According to HOOR (347), argentamin has marked bactericidal properties and in this respect is more valuable than nitrate of silver. Furthermore it passes more deeply into the tissues and also contracts the vessels. A 5–10 % solution is well borne by the eye, which cannot be said of silver.

MAZZA (348) reports favorable results from the use of $\frac{1}{4}$ to $\frac{1}{3}$ % nitrate of silver in cases of deep corneal ulcer with much secretion, when the resulting scar need not be taken into consideration.

H. LANDOLT (349) commends the use of extract of suprarenal capsule in operations in order to diminish hemorrhage, and as an adjuvant to cocaine, atropine, eserine, and the like, in cases of inflammation, to reduce the irritation.

In BARKAN'S (350) 12 cases of magnet extraction the eye was saved in 8, 4 retaining good vision, and 4 more or less useful vision. According to Barkan, the Haab magnet accomplishes all that can be obtained with the small magnet: it does not injure the vitreous and lead to infection, and it is a good sideroscope.

ABELSDORFF.

DUNN (351) finds that asthenopia in patients wearing glasses of different strengths may be due to looking through the lower portion of the glasses and thus obtaining unequal prismatic or astigmatic effects in the two eyes. Proper decentring downward relieves the symptoms. ABELSDORFF.

PYLE (352) in this paper gives a thorough study of the

hydrophthalmic condition, in addition to a full report of three cases of his own, including two pathological examinations. A most exhaustive bibliography of 106 titles is appended. From this study he concludes that all cases of hydropthalmos can be divided into two classes. 1. True hydropthalmos depending upon congenital defective development of the cornea, iris, or filtration channels. 2. Those secondary to fatal intraocular inflammations, usually in the form of irido-keratitis or irido-cyclitis, and keratitis causing closure of the iris angle and filtration channels. The treatment should be myotics, iodides, and mercurials, repeated paracentesis, and, these failing, a broad iridectomy. The prognosis is better than is generally believed. BURNETT.

MARSHALL'S (353) specimen showed a coloboma of the iris and a large coloboma of the choroid, with which was associated an extensive detachment of the retina. Sections through the coloboma showed that the retina was continuous over this area and was adherent to the thin and bulged sclerotic, though elsewhere detached.

On separating the iris, ciliary body, and choroid from the cornea and sclerotic, a peculiar band of tissue was seen running from the coloboma of the iris to the apex of the choroidal coloboma. Microscopic sections showed that this band consisted of ciliary processes which had become fused.

Owing to old inflammatory changes and degeneration of the lens, nothing definite could be made out with regard to its structure or that of the suspensory ligament.

III.—INSTRUMENTS AND REMEDIES.

354. EMMERT. Protargol, a new preparation of silver. *Corr. Bl. f. Schw. Aerzte*, 1899, No. 19.

355. MAZZALI. On the use of protargol in ophthalmology. *Report of the XV. Italian Ophthalmological Congress*, Turin, 1899.

356. HILBERT. The effect of tropococaine in anæsthetizing the cornea and conjunctiva. Tübingen, J. Pietzker, 1899.

357. KNAPP, H. Note on the use of euphthalmine. These ARCHIVES, xxviii., 3, p. 313.

358. PRETORI. On the treatment of some eye diseases with largin. *Wochenschr. f. Ther. u. Hygiene d. Auges*, ii., No. 44.

359. SELENKOWSKI. On the improvement of our yellow salve. *Wratsch*, 1899, No. 15.

360. WOLFFBERG. Lymph stasis in the eye produced by dionin, a new observation of physiological and therapeutical interest. *Wochenschr. f. Ther. u. Hyg. d. Auges*, iii., No. 1.

361. LANDOLT. New opto-types for determining the acuteness of vision. *Arch. d'opht.*, xix., 8, p. 465.

362. NEUSTÄTTER. A new optometer skiascope for the subjective and objective determination of refraction, astigmatism, and direction of the principal meridians. *Münch. med. Wochenschr.*, 1899, No. 3.

363. CLUZET. A new procedure for determining the degree of ametropia. *Arch. d'opht.*, xix., 8, p. 492.

364. DIXON. On photographing macroscopical eye specimens. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1899.

365. EATON. Two new instruments for measuring the monocular field of fixation. *Ophth. Record*, Aug., 1899.

366. JACKSON. The mydriatic effect of euphthalmin. *Ibid.*, July, 1899.

367. JOHNSON, J. S. Nitric acid as a cautery in corneal ulcers. *Am. Jour. of Ophth.*, July, 1899.

EMMERT (354) uses protargol in 1–3 per cent. solution two or three times daily in catarrhal conjunctivitis and blennorrhœa. It is also of value in phlyctenulæ, spring catarrh, and follicular conjunctivitis. In 5–20 per cent. ointment it is useful in eczematous keratitis, mycotic inflammations of the cornea, blepharitis ciliaris, and herpes pustules of the lids. Dacryocystic blennorrhœa is cured rapidly by injections of 5–10 per cent. solution.

As a local anæsthetic, HILBERT (356) prefers tropococaine to cocaine since it does not render the corneal epithelium opaque, does not increase tension, nor dilate the pupil. It has some antiseptic properties and is but slightly toxic. It is best used in 5 per cent. solution.

KNAPP (357) regards euphthalmine as the best mydriatic for ophthalmoscopic purposes. It has the advantage of not irritating the skin or conjunctiva and therefore can be used with patients who have an idiosyncrasy against atropine. ABELSDORFF.

Largin is, as PRETORI (358) reports, adapted to take the place of nitrate of silver in many cases since it acts as well and as

quickly, and is less dangerous and painful, and therefore can be used without special precautions.

A series of experiments convinced SELENKOWSKI (359) that freshly prepared oxide of mercury that had not been fully dried was less disposed to form lumps than that in the market which was dried by heat, that it was less affected by the action of light, that it could be more uniformly rubbed up in vaselin without previously being mixed with an oil, and that the salve was not so readily decomposed by the fatty acids. The best vehicle is white vaselin. HIRSCHMANN.

Dionin is the hydrochlorate of the mono-ethyl-ether of morphine and is very soluble. WOLFFBERG (360) uses it in the form of 10–25 per cent. dionin-cacao pastilles. At first there is watery œdema of the lid margins and chemosis, but this passes off in two or three hours. The process of recovery in fascicular keratitis, perforating injuries, and corneal ulcers is hastened by dionin.

LANDOLT (361) again calls attention to his test of visual acuteness which is based on the determination of the smallest angle under which two points may be recognized as separate. On his chart are fifteen circles of various diameter and thickness of line, each broken at one point which the patient is required to locate. The distance at which the normal eye can recognize the break is indicated for each circle. V. MITTELSTÄDT.

In CLUZET'S (363) instrument for determining refraction the distance of the inverted image from a lens close to the eye is measured. At one end of a horizontal rod is a convex lens of 15 D which is brought close to the cornea. On the rod is a movable glass plate engraved with vertical lines 1 *mm* apart. The eye is illuminated with an ophthalmoscope, and the inverted image of a well-marked point like the bifurcation of a vessel is made to cover one of the vertical lines in the glass plate. The observer then moves slightly to the side and observes whether the image still covers the line. If it does, the eye is emmetropic; if the image moves, but less than the line, there is myopia; if more, there is hyperopia. The disc is now shifted until the image covers the line and a scale on the rod indicates the degree of ametropia.

DIXON (364) describes and illustrates in this article a method for photographing specimens after they are mounted in glycerine jelly in glass cups. The difficulty has been to get rid of the reflection of the light from the glass covers. He has accomplished this by the use of tubes and other appliances which are

too technical to abstract. The specimens printed show how successful the effort has been. BURNETT.

The first of the instruments presented by EATON (365) is a modification of his reflecting tropometer described in the *Ophthalmic Record* for Sept., 1898. This consists mainly in an appliance for fixing it firmly to the head. The other instrument is used for the same purpose, but can with difficulty be described intelligently without diagrams. The principle, however, lies in causing each eye to look through a tube at the end of which is attached an arc, with a radius of 27.5 centimetres, with its centre in the eye. On this the measurements are made and recorded. BURNETT.

JACKSON (366) thinks that euphthalmin is, for certain uses, superior to any other single mydriatic. This is where a strong dilatation of the pupil is required for diagnostic purposes, and which will pass away rapidly. Its influence upon the accommodation is slight. He thinks its combination with cocaine useful in solutions of 1 % each. BURNETT.

JOHNSON (367) has used nitric acid as a cauterizer in corneal ulcers for some years with much satisfaction. He employs a solution of the pure acid varying from 9 to 15 % in water. The application, after cocainization, is made with a piece of soft wood, its effects being carefully watched. BURNETT.

Sections IV.–VII. Reviewed by DR. BERNHEIMER, VIENNA.

IV.—ANATOMY.

368. DIMMER. On the optic-nerve tracts. *Graefe's Archiv*, xlviii., 3.

369. ISCHREYT. On the course of the fibre bundles in the human sclera. *Ibid.*, p. 506.

370. COLLINS, TREACHER. A note on the elastic tissues of the eyeball, as shown by sections stained with acid orcein. *Ophth. Hosp. Reports*, xv., part 1.

DIMMER (368) was the first to be able to follow in man the degeneration of the optic-nerve fibres up to the primary optic-nerve ganglion by means of the Marchi osmic-acid staining method. This method demonstrates absolutely the semidecussation in the human chiasm, and gives us information in regard to the location of the crossed and uncrossed bundles in the optic

nerves, chiasm, and tracts. The degenerated nerve-fibres entered the external geniculate body, the crossed bundles chiefly going to the ventral medulla, and the uncrossed more to the centre of the ganglion.

There was slight degeneration in the arm of the anterior corpus quadrigeminum. In the pulvinar there was a slight degeneration, particularly in the portions which lay near the arm of the anterior corpus quadrigeminum. In the internal geniculate, the posterior quadrigeminal, and in the corpus Luys no changes were found.

Examination of the optic-nerve stump by Weigert's method showed many unchanged fibres. In man, either six weeks is not long enough to produce complete degeneration of all the fibres, or the unchanged fibres are to be regarded as more resistent pupillary fibres or as centrifugal fibres arising in the anterior corpora quadrigemina.

ISCHREYT (369) cut out 107 strips from the scleræ of 5 human eyes and examined them. In the anterior half of the sclera, excepting the portion near the limbus, there are two chief directions in which the slightly wavy bundles run. About the equator and at the points of insertion of the muscles the arrangement is more complicated.

The method of staining elastic tissue with acid orcein was introduced by Unna. By its means, according to COLLINS (370), elastic tissue is stained a brown color, whereas the surrounding tissue stains a dull pink. In the sections of the *cornea*, Descemet's membrane stains deeply, and the ligamentum pectinatum into which it divides can be traced into the sclerotic some way beyond the space of Fontana, extending ultimately through about half the width of the sclerotic. Bowman's membrane, on the other hand, stains a dull pink, precisely as the substantia propria, which is additional evidence of its differing in nature from Descemet's membrane. In the *sclerotic*, a number of fine fibres are picked out, and these are more numerous in the outer layers and at the back of the eye, while around the optic nerve there is a dense plexus. The lamina cribrosa is largely composed of elastic fibres, and from it a delicate network extends backwards round the central blood-vessels of the optic nerve.

The elastic tissue in the blood-vessels in all parts of the eye is picked out and in the *iris* there is no other elastic tissue found. In the *choroid* and *ciliary body* the membrane of Bruch stains deeply; and in the *lens* the capsule stains a reddish brown as

opposed to the dull pink of the lens fibres. The fibres of the *suspensory ligament* also stain more deeply than the surrounding tissues.

Other elastic tissue is found in the dural and pial sheaths of the nerve, in the tendons of the recti, and in the sheath around the muscles; also in the conjunctiva between the epithelium and the sclerotic.

V—PHYSIOLOGY.

371. FUMAGALLI. On the minute anatomy of the third eyelid. *Report of the XV. Italian Ophth. Congress*, Milan, 1899.

372. THORNER. A new fixed ophthalmoscope, giving an image free from reflexes. *Zeitschr. f. Psych. u. Phys. d. Sinnesorgane*, xx., 4–5, p. 294.

373. ORSCHANSKY. A method of studying ocular movements directly (ophthalmography). *Centralbl. f. Physiol.*, xii., No. 24.

374. MICHEL. The effect of cold upon the refractive media of the eye. From "Contributions to Physiology," *Festschrift for the Seventieth Birthday of Professor Fick.*

375. TURK. Investigations on the origin of the physiological pulsation of the retinal veins. *Graefe's Archiv*, xlviii., 3, p. 513.

376. BERNHEIMER. Experimental studies on the paths for the synergetic movements of the eyes in monkeys and the relations of the corpora quadrigemina to these paths. *Report of the Academy of Sciences of Vienna, Naturw.-math. Classe*, cviii., 3, May, 1899.

377. PERGENS. On the processes in the retina when illuminated by different colored lights of equal intensity. *Zeitschr. f. Augenheilk.*, i., 2.

378. PRENTICE, CHALMERS. Evolution of the lines of sight. *Lancet*, 1899, p. 1629.

379. PERCIVAL. Relation between visual acuity and efficiency. *Ophth. Review*, Aug., 1899, p. 211.

380. NORTON, C. E. Seeing capillary circulation in one's own retina. *Jour. Amer. Med. Assoc.*, July 15, 1899.

381. STILLSON, H. The subjectoscope. *Ibid.*, July 8, 1899.

382. BARNES. The crisis in binocular vision. *Annals of Ophth.*, July, 1899.

FUMAGALLI'S (371) investigations were in regard to the so-called third lid of the rabbit, dove, and hen, taking up the anatomical structure of the organ, particularly with reference to the nerve endings as revealed by the Golgi method.

KRAHNSTÖVER.

THORNER (372) has devised an instrument in which, by an arrangement of screens, the illuminating system is separated from the observation system. It is thus possible to introduce light from one half of the cornea through the pupil, while observation is made through the other half of the cornea and the corneal reflexes are eliminated. The image obtained allows small details to be seen very clearly.

v. MICHEL (374) has found that when the water is extracted from the albuminous tissues of the eye, refraction is interfered with and the tissues appear cloudy. Cornea and lens contain enough albumen to act like egg albumen. The aqueous and vitreous humors in consequence of their small amount of albumen remain clear.

The opacity caused by freezing is not due to a change in anatomical structure. The coagulation temperature of the frozen and the unfrozen cornea and lens is the same. From this one might conclude that in the opacity due to freezing the composition of the albuminous bodies is not changed.

TURK (375) believes that the retinal venous pulsation arises from a continual extension of the pulse waves from the arteries through the capillaries to the veins. This abnormal extension of the pulsation is caused by the high extravascular pressure to which the vessels of the eye are normally exposed.

BERNHEIMER (376) made a series of experiments on monkeys for the purpose of determining the paths for the synergetic movements of the eyes and the relations of the corpora quadrigemina to these paths.

Experiments were made on narcotized animals (1) without electric or mechanical excitation of the brain, (2) with electric excitation of the cerebral cortex, and (3) observations were made on animals from which the corpora quadrigemina had been extirpated. The results of experiments on nineteen monkeys were as follows :

A monkey whose occipital lobes had been removed performed perfectly synergetic eye movements, both spontaneously and on peripheral, mechanical, or electrical excitation. The same syner-

getic movements were performed when the anterior corpora quadrigemina were removed, and in this case simple light stimulus was sufficient to bring about the movements.

Only when the nuclear regions of the eye nerves were separated by a median section did the synergetic movements cease and the two eyes move irregularly and independently.

The angular gyrus is a pronounced cortical field for synergetic eye movements ; the right gyrus controlling synergetic movements to the left, and the left gyrus movements to the right.

After destruction of the corpora quadrigemina down to the aqueduct of Sylvius, excitation of the angular gyrus still brings about synergetic movements.

After destruction of the anterior corpora quadrigemina, no disturbances of the eye movements are noticed. The only recognizable change is that the pupil on the same side becomes larger and reacts less readily to light.

From all this it is evident that the anterior corpora quadrigemina are not a reflex centre for eye movements, nor do the neurons pass through them to the cortex. Since after median section of the region containing the nuclei of the ocular muscles no eye movements can be brought about by excitation of the right or left angular gyrus, it follows that the neurons connecting the nuclei with the cortex of the angular gyrus must all cross ; the crossing must take place in the median line, but below the level of the aqueduct of Sylvius, since removal of the roof of the corpora quadrigemina does not prevent synergetic movements from being brought about by excitation of the angular gyrus.

Thus the influence of the cerebral cortex on the nuclei of the ocular muscles is of the same type as that on the nuclei of the facial nerves and of the motor nerves of the extremities.

PRENTICE (378) calls attention to the well known fact that in herbivorous animals the lines of sight diverge, while in the carnivorous animals the divergence is less marked. In the savage races a general tendency to divergence is noticeable. With the advance of civilization a tendency to converge becomes manifest, which depends perhaps less on the anatomical conditions of the internal recti than on a tonic innervation of these muscles. This functional convergence ceases with life. In 3000 cases the author assured himself that almost without exception the eyes of the dead diverge. ABELSDORFF.

PERCIVAL (379) points out that loss of visual efficiency is not

proportional to loss of visual acuity; thus an individual whose visual acuity is reduced from $\frac{6}{6}$ to $\frac{6}{12}$, has not suffered a loss in efficiency of 50 per cent. He suggests a formula for calculating the loss of efficiency of vision sustained from injury or disease, which might be of use in estimating a fair compensation to be claimed from insurance companies or employers. LISTER.

NORTON (380) has found that the flying white spots, which are undoubtedly corpuscles passing through the lumen of the retinal arteries, are best seen if the source of illumination—a bright even sky, for instance—is viewed through a blue glass; any colored glass, however, can be used. BURNETT.

STILLSON (381) has devised an apparatus for the more ready observation of the various kinds of ocular spectra, such as the Purkinje figures, the flying white specks, etc. It consists in a three-inch lens mounted in a short tube having a clamp at the other end, into which diaphragms having pinholes of various sizes can be placed; 18 inches from the distal end is a clamp for holding plates of plain or colored glass and a white cardboard, and beyond, a mirror mounted on a swinging arm that will reflect the light through the glass plate and through the tube holding the lens and pinholes, into the eye of the observer. This serves the same purpose as the point of light from a very strong convex surface used by Zehender, Ayres, the reviewer, and others.

BURNETT.

BARNES (382) says that to create or restore binocular vision he has a fourfold method: 1. Correct all errors of refraction. 2. Orthoptic exercise. 3. Tenotomies and advancement. 4. Refine with orthoptic exercise. He inclines much more to advancements than tenotomies. He gives a table showing the management and results in 24 cases in which binocular vision was restored by these methods. BURNETT.

VI.—REFRACTION AND ACCOMMODATION.

383. KATZ. Headache from low degrees of ametropia. *Wratsch*, No. 28, 1899.

384. PETERS. On myopia from auto-suggestion in school children. *Zeitschr. f. Augenheilk.*, ii., p. 246.

385. CARTER, BRUDENELL. A case of operation for extreme myopia. *Lancet*, p. 87, 1899.

386. WEILAND. What amount of axial myopia theoretically

produces emmetropia for distance after removal of the crystalline? *Annals of Ophth.*, July, 1899.

387. HAIGHT, ALLEN T. Myopia—operative treatment in high degrees thereof. *Jour. Amer. Med. Assoc.*, July 15, 1899.

388. CROSS. On the operative treatment of myopia. *Lancet*, July 1, 1899.

388 *a*. FROST. The optical effect of the removal of the lens in myopia. *Lancet*, July, 1899, p. 155.

PETERS (384) describes cases which he has observed of apparent myopia without spasm of accommodation in school children, that were relieved by wearing very weak — or + glasses, or even plain glasses. These children were all neurotic. He would, however, separate these cases from those of hysterical amblyopia and regard them as cases of myopia by auto-suggestion, since in every case the child simulated perfectly a myopia both in distant and near tests.

CARTER (385) first did extraction of the lens for myopia about 12 years ago, the patient being a boy with 14 D of myopia. The good results have still remained. A young girl with R — 18 — 6 c and L —12.5 — 6 c was operated on with the result R + 1.5 + .5 c, L + 1.5 + 1.5 c; V = $\frac{20}{20}$. ABELSDORFF.

In this paper WEILAND (386) gives his reasons and demonstrations to show that Jackson is in error in considering that an axile myopia of 17 D will give emmetropia after suppression of the refracting power of the lens, as it is supposed to be in Helmholtz's schematic eye. His calculations make 25 D as the measure of the myopia that under these circumstances give emmetropia. Jackson defends his position in a paper in the same number. BURNETT.

HAIGHT (386) has operated upon four cases of myopia of high degree. Case I. Girl of 12, R V $\frac{10}{200}$, L $\frac{2}{200}$; L — 16 D, R — 14 D. Discission of left lens, after absorption, L $\frac{20}{80}$ and could read fine print with + 5. Case II. Boy 18 years, M 18 D L, 23 D R. Best vision, R $\frac{20}{80}$, L $\frac{20}{100}$. Left lens, discission and extraction. After three months, V = $\frac{20}{30}$. R eye after same treatment, $\frac{20}{30}$, with — 1.5 c 120°. Case III. Man of 22, M 15 D in each; V $\frac{5}{200}$. Discission and extraction, after which V = $\frac{20}{40}$, but required + 3 and + 4 for reading. Case IV. Girl of 11 years, R 10 D of M, 16 D in L; L lens treated by discission and allowed to absorb. After six months, V = $\frac{20}{60}$. BURNETT.

CROSS (388) considers that the operative treatment of myopia in properly selected cases has gone beyond the experimental stage, and should rank as a thoroughly recognized surgical procedure. The operation he advises in young subjects is discission of the lens, with subsequent linear extraction (= curette evacuation) before or as soon as tension is manifested. In young children simple discission is often sufficient; in older patients he advises a preliminary iridectomy, followed by slight discission of the lens previous to extraction.

He has operated on 48 cases, of which he gives a full table, showing the results. He does not regret having undertaken a single case; not only is the vision improved in almost every case, and in some very greatly, but the general aspect of the patients is changed; they lose their dreamy manner, gain confidence, and take interest in their surroundings. LISTER.

FROST (388 *a*) demonstrates clearly how the removal of the lens affects the refraction of the eye. With the lens in situ, every millimetre of difference in the length of the globe corresponds to about 3 D of myopia or hypermetropia. But the aphakic eye being much weaker as an optical instrument, changes in the length produce much less effect, every millimetre of difference corresponding with about 1.38 D.

The emmetropic length of an eye, with the lens in situ is about 23 *mm*, but the emmetropic length of the aphakic eye is about 31 *mm*. Therefore abnormalities in length are calculated from different standards in the complete and aphakic eyes.

Example.—With a myopia of 15 D −, the eyeball is 5 *mm* (15 ÷ 3) longer than the emmetropic eye, and is therefore 28 *mm* in length. After removal of the lens it is 3 *mm* shorter than the emmetropic aphakic eye, and requires for its corrections a lens of 4 D− (1.38 D × 3). LISTER.

VII.—MUSCLES AND NERVES.

389. SCHNABEL. Minor contributions to the subject of paralysis of the ocular muscles and of squint. *Wiener klin. Wochenschr.*, Nos. 20, 22, and 31, 1899.

390. SACHS. Can squint cause amblyopia? *Ibid.*, No. 25.

391. ZUCKERKANDL and ERBEN. 1. On the physiology of voluntary movements. 2. On lateral movements of the eye. *Ibid.*, No. 23.

392. STORY. Note on the methods of advancing the recti muscles of the eyeball. *Ophth. Review*, July, 1899.

393. HANSELL and SPILLER. Two cases of unilateral total ophthalmoplegia, crossed hemiplegia being associated with the ocular paralysis in one case. *Annals of Ophth.*, July, 1899.

394. GREENE, D. MILTON. Correction of divergent strabismus by a new method and a new instrument. *Ophth. Record*, Sept., 1899.

SCHNABEL (389) discusses first the diplopia occurring with deviation of the visual line from paralysis of an ocular muscle, and the single vision with deviation of the visual line in squint. He then takes up the function of the muscles moving the eyes laterally and the results of their paralysis, and finally he discusses the theory of squint and squint operations.

According to his idea, the anatomical basis of squint exists when with healthy muscles the distance between the centres of the two corneas in the position of rest is not equal to the distance between the centres of the palpebral fissures, and binocular fixation therefore requires an undue effort on the part of the ocular musculature. If this effort cannot be maintained, monocular fixation results—manifest strabismus. The difference between the two distances between the centres of the corneas and the centres of the palpebral fissures, in rest, is the measure of the deviation of the squinting eye. Since, according to Schnabel, the ocular muscles of those with squint are normal, and the movements of the eyes follow a normal type, the squinting eye accompanies the fixing eye in normal manner, the primary deviation is equal to the secondary, and the degree of deviation remains the same while the accommodative effort is constant. The exclusively uniocular fixation of the squinting person prevents the formation of a common visual field or the development of the function of the macula in the squinting eye to normal vision. The detachment of a muscle alters the position of the centre of the cornea in the position of relative rest by rendering it paretic, and it lessens or corrects the deviation when it causes the centre of the cornea in a position of rest to reach the centre of the palpebral fissure.

SACHS (390) discusses the current ideas in regard to amblyopia ex anopsia and amblyopia strabotica. It seems to him that in fact a particular form of amblyopia is found in squinting eyes whose dependence upon the squint is explained when we consider the manner of seeing of the strabismus patient. The loss of the

ability to direct the entire attention to the impression received by the squinting eye, when both eyes are open, is a characteristic mark of amblyopia strabotica. The final stage of the amblyopia strabotica thus characterized is reached when the squinting eye has lost the ability to fix with the macula. In these rare cases the diminution of vision in the squinting eye must be considered as being dependent upon the squint.

ZUCKERKANDL and ERBEN (391) have made some interesting observations on the lateral movements of the eye, using as material dead bodies and patients with paralysis of the ocular muscles. The muscles which turn the eyes to the right have their sphere of action in the right half of the palpebral fissure only, both in the matter of adduction and of abduction. Similarly the sphere of action of the muscles turning the eyes to the left lies in the left half of the palpebral fissure only. The eye is under the influence of elastic forces which are sufficient to bring it from any position back to the middle of the palpebral fissure.

In one of the cases reported by HANSELL and SPILLER (393) a man received a punctured transverse wound of the lower lid of the right eye from the thrust of an umbrella ferule. No fracture of the bony walls or floor of the orbit could be detected. There was, as a result, a total ophthalmoplegia exterior and interior. From this he in time recovered, but was attacked by a crossed hemiplegia which remained permanent in a degree. The seat of the lesion was, apparently, at the sphenoidal fissure. The other case was seen for only a short while, and the ophthalmoplegia followed a blow on the inner third of the temporal ridge on the left side. There was a marked depression at the seat of injury.

BURNETT.

GREENE'S (394) method of making a "tuck" in the tendon has been used by several before him, but he has devised a pair of forceps which, by passing one blade beneath the tendon, the other being over it, and then screwing them together, makes a fold in the tendon and holds it firmly while he puts in catgut sutures to hold it permanently. The conjunctival flap which is made in exposing the tendon is replaced. There is usually but little reaction.

BURNETT.

Sections VIII.–XII. Reviewed by DR. R. SCHWEIGGER, Berlin.

VIII. — LIDS.

395. WINSELMANN. On hyperopia as a cause of blepharitis (preliminary communication). *Zehender's klin. Monatsbl.*, xxxviii., p. 240.

396. DENIG. A contribution to the etiology of congenital trichiasis. *Arch. f. Augenheilk.*, xl., 1, p. 121.

397. KUHNT. On true congenital distichiasis. *Zeitschr. f. Augenheilk.*, ii., 1, p. 46.

398. MALGAT. Note on entropium and consecutive trichiasis in the lower lids of the aged. *Rec. d'opht.*, 1899, 8, p. 455.

399. ARD. Blepharitis due to the demodex folliculorum. *Journ. Amer. Med. Assoc.*, 33, No. 4.

400. KARKASCHWILI. On transplantation of the mucosa of the lip in cases of entropium. *Wjest. Ophth.*, 1899, 4–5.

401. MOAURO. Marginal tarso-blepharoplasty. *Report of the XV. Italian Ophth. Congress*, 1899.

402. PES ORLANDO. A clinical contribution to the surgical treatment of true blepharospasm. *Clinica dell' Univers. di Torino*, 1899.

403. DROOGLEEVER FORTUYN. On pathological synchronous movements of the upper lid occurring with movements of the jaw and eyeball. *Inaug. Dissert.*, Freiburg-in-Baden, 1899.

404. WALSH and STEPHENSON. Notes on a case of "lupus lymphaticus" of the eyeball. *Lancet*, p. 1562, 1899.

405. VELHAGEN. A case of angioma lipomatodes of the eye. (Clinical report.) *Zehender's klin. Monatsbl.*, xxxviii., p. 253.

406. PARKER, RUSHTON. Plexiform neuroma of eyelids with ptosis; excision; ptosis relieved by Panas's plastic operation. *Brit. Med. Jour.*, p. 1463, 1899.

407. ZUMSTEEG. Three cases of coloboma of the upper lid. *Dissert.*, Tübingen, F. Pietzker, 1899.

408. KUHNT. A short note on the operation for epicanthus. *Zeitschr. f. Augenheilk.*, 1899, ii., 2.

409. GINSBERG. Remarks on Dr. Cohn's paper on herpes zoster ophthalmicus. *Arch. f. Augenheilk.*, xxxix., 4, p. 381.

410. NOYES. Plastic operation for ectropium of the lower lid, with remarks. *N. Y. Eye and Ear Infirmary Reports*, Jan. 1, 1899.

According to WINSELMANN (395), the subjective annoyances of hyperopia cause the patient to rub the eyes frequently with the fingers, thus bringing about a seborrhœa.

KUHNT'S (397) patient, a woman of fifty-two, had along the margin of the lid a row of fine hairs in place of the ducts of the Meibomian glands, which were wanting. Microscopically there was found a double row of Krause's glands in the tarsus and extraordinarily well-developed Moll's glands along the posterior row of cilia. The excision of a portion of the tarsus and the lid 2 *mm* high, preserving the conjunctiva, was not fully successful. The author believes that it would have been better to have excised both tarsus and conjunctiva for a distance of 3-5 *mm* from the lid margin and cover the defect with mucosa from the lip.

KARKASCHWILI (400) has transplanted a flap of mucosa from the lip to the intermarginal space in 112 cases of entropium with trichiasis. The transplanted flap became necrotic in one case, in another the flap disappeared in the course of six weeks, in four there was partial necrosis, but in all the others the result was complete. In case of excessive shrinking of the conjunctiva, a portion of the grafted mucosa turned in and took the place of the absent conjunctiva. In five cases the grafts were not sutured but still remained in place. The wound in the lip was never sutured, and always healed in a linear scar. The operation was usually done without narcosis. Recurrences had not been observed. The author prefers this method to all others.

HIRSCHMANN.

DROOGLEEVER FORTUYN'S (403) patient had had a polyneuritis and seven months later a poliencephalitis superior acuta (Wernicke), and the following symptoms on the part of the left eye remained: the palpebral fissure was slightly narrower than the right, raising the lid was done slowly, limited mobility of the ball in all directions, no pupillary reaction, paralysis of accommodation, vision good. When the eye was abducted, the upper lid was raised so that the palpebral fissure was equally wide on both sides. When the eye was adducted, the lid drooped. When the eye was turned downward and inward, the upper lid was elevated.

WALSH and STEPHENSON'S (404) patient, a girl of eighteen, had a congenital anomaly of the right eye. The ball was small, there was a persistent pupillary membrane, and on the lids a nævus corresponding to Hutchinson's "lupus lymphaticus" of the skin, or lymphangioma. The lids were thickened as in elephantiasis; the plica semilunaris was enlarged and attached to a new growth in the conjunctiva which consisted in a number of transparent yellowish vascular elevations about the cornea.

ABELSDORFF.

PARKER'S (406) patient had a plexiform neuroma of the upper lid which covered the ball and made elevation of the lid impossible. After excision of the tumor, Panas's operation was done for the ptosis, and finally the orbicularis was sutured to the temporal fascia, since the closing of the lid was interfered with.

ABELSDORFF.

ZUMSTEEG (407), discussing sixty-three cases of coloboma of the lid reported in the literature and three cases of his own, divides them all into four categories: (1) simple coloboma, unilateral or bilateral; (2) coloboma with slight changes in the ball near the coloboma; (3) coloboma with dermoid formations, bridges of skin between the forehead and eyeball, and corneal changes; (4) coloboma with other facial defects, particularly the oblique facial cleft. He believes, like van Duyse, that the uniform cause of such malformations is a circumscribed intrauterine adhesion between the amnion and the outer cuticle covering the ocular vesicle of the embryo.

NOYES'S (410) case was that of a girl of fifteen with a cicatricial ectropion of the left lower lid from a burn, the edge of the lid being 15 *mm* below its normal position. A flap, with a pedicle, from the post-auricular region was used and carefully fitted into the space left by the dissection of the lid. The lower, convex edge was stitched first; after the gap caused by the removal of the flap was closed, all fat and superfluous tissue was removed from the under side of the flap. To round off the corner where the flap was turned on itself, the external canthal ligament was divided, and a small bit of skin of the upper lid, where the flap overlapped it, was excised. The thickening and rounding of the flap, which he has observed before in similar cases after healing, he is disposed to treat by cutting along the lower border line of the cicatrix and excising tissue there rather than at the middle of the flap.

BURNETT.

IX.—LACHRYMAL APPARATUS.

411. SOURDILLE. Benign cystic tumors of the lachrymal gland (dacryops). *Arch. d'opht.*, xix., 8, p. 482.

412. STRSCHEMINSKY. Polypus of the lachrymal sac with histological examination by Gorfein. *Wratsch*, 1899, No. 29.

413. DAXENBERGER. Suppuration of the lachrymal sac and empyema of the ethmoid cells. *Wochenschr. f. Ther. u. Hyg. d. Auges*, 1899, No. 23.

414. FROMAGET. Paroxysmal hysterical lachrymation. *Ann. d'ocul.*, cxxii., 1, p. 61.

415. VALUDE. The bactericidal action of the tears. *Arch. d'opht.*, 1899, No. 9.

416. SCHEFF. On the relation of nasal to ocular diseases, with special reference to the nasal duct. *Wiener. klin. Wochenschr.*, 1899, 22–28.

417. NOYES. Lachrymal disease. *N. Y. Eye and Ear Infirmary Reports*, January, 1899.

SOURDILLE (411) had the opportunity of examining the tumor and the diseased lachrymal gland in a case of dacryops that he had followed clinically. The cyst at the inner canthus had appeared ten years before. On pressure the tears escaped and the tumor became smaller. Later the tumor remained as large as a hazel-nut. The cyst consisted of a fibrous capsule lined with epithelium which in part was changed and in part appeared to belong to the ducts of the gland. Many ducts opened into the cyst, and their walls were sclerosed and distended. The accompanying chronic inflammation had involved the connective tissue about the acini and formed fibrous bands which had caused the lobules to become atrophic. As the cause of the affection the author regarded an inflammation arising from infection from the conjunctiva, passing along the ducts and reaching the connective tissue. When the ducts became closed at their conjunctival ends the cysts developed. v. MITTELSTÄDT.

The clinical picture in STRSCHEMINSKY'S (412) case of polypus of the lachrymal sac resembled that of ectasia of the sac. The polypus sprang from the posterior wall of the sac and had a pedicle 3 *mm* thick. In structure it was a fibroma cavernosum. HIRSCHMANN.

For certain cases of persistent stricture of the nasal duct, NOYES

(417) uses a style of lead or silver continuously for some weeks. It need not be larger than No. 6 Bowman. The style should be taken out once daily or every other day, and the canal syringed. He relates a case in illustration. BURNETT.

X.—ORBIT AND NEIGHBORING CAVITIES.

418. DAGILAISKI. On orbital phlegmon of dental origin. *Zehender's klin. Monatsbl.*, xxxvii., p. 231.

419. SZNLISLAWSKI. On the development of brain abscesses after orbital phlegmon. *Ibid.*, p. 289.

420. UHTHOFF. A case of syphilitic disease of the orbit. *Allgem. med. Central-Zeitung*, 1899, No. 55.

421. HALLMANN. On the development of orbital tumors after trauma. *Inaug. Dissert.*, Leipsic, 1899.

422. LOBANOFF. Cylindroma of the orbit. *Wjest. Ophth.*, 1899, 4–5.

423. ZIMMERMANN. Demonstration of a boy six years old from whose orbit a retrobulbar cavernoma had been removed nine months before. *Ophth. Klinik*, 1899, No. 13.

424. GOLOWIN. Krönlein's operation for tumors of the optic nerve. *Wjest. Ophth.*, 1899, 4–5.

425. VALUDE. Krönlein's operation. *Gaz. hebdom. de méd. et de chir.*, 1899, No. 62.

426. WEISS. Extirpation of a large retrobulbar tumor by Krönlein's method, with preservation of vision, normal position, and mobility of the eye. *Münch. med. Wochenschr.*, 1899, p. 1265.

427. BÖHM. A case of spontaneous exophthalmus during birth. *Die ophth. Klinik.*, 1899.

428. GILBERT and CASTAIGNE. Exophthalmic goitre. *Le progrés méd.*, 1899, No. 23.

429. PITRES. The treatment of exophthalmic goitre by injections of iodoformed ether into the parenchyma of the thyroid body. *La semaine méd.*, 1899, No. 33.

430. WHITE, HEATON. Organo-therapy in exophthalmic goitre. *Brit. Med. Journ.*, p. 787, 1899.

431. PETERS. Remarks on the result of nasal treatment in diseases of the eye. *Zeitschr. f. Augenheilk.*, 1899, ii., 2.

432. HUNTER. A case of gumma at the apex of the orbit. *N. Y. Eye and Ear Inf. Reports*, January, 1899.

433. NOYES. Cases of ethmoiditis. *Ibid.*

434. BURNETT. A case of traumatic enophthalmus. *Amer. Journ. of Ophth.*, July, 1899.

435. BRUNS and ALT. A case of spindle-cell sarcoma of the orbit. *Ibid.*, Sept., 1899.

436. BRUNER. Septic thrombosis of the cavernous sinuses. *Ophth. Record*, July, 1899.

According to DAGILAISKI (418) alveolar suppuration may be transmitted to the eye either through the periosteum of the anterior wall of the upper jaw, with its network of veins which anastomose with the superior and inferior ophthalmic veins; or through the antrum by the pus breaking through its upper wall. He mentions in conclusion those diseases of the eye which have been supposed to stand in some reflex connection with the teeth viz., phlyctenular conjunctivitis, paresis of the ciliary and other ocular muscles, glaucoma, amblyopia, cataract, etc.

SZNLISLAWSKI (419) found that orbital phlegmon might lead by metastasis both to meningitis and to brain abscess. In cases in which there are no focal symptoms the abscess may be presumed to be in the frontal lobe corresponding to the phlegmon.

In UHTHOFF'S (420) patient the right eye had gradually become prominent in the course of two months and all the orbital nerves had become involved. A scar suggesting syphilis was found in the rhino-pharynx and under anti-syphilitic treatment the orbital tumor disappeared in a few days.

The tumor described by LOBANOFF (422) was situated on the anterior portion of the inferior wall of the orbit and proved to be a cylindroma with amyloid degeneration. HIRSCHMANN.

In ZIMMERMANN'S (423) case a congenital cavernoma of the orbit, diagnosed *per analogiam* from the presence of a vascular tumor of the forehead, caused an exophthalmus of 11 *mm* in its six years of growth. Compression of the common carotid caused the ball to recede 4 *mm* temporarily. After operative removal of the tumor from before, the exophthalmus gradually disappeared.

GOLOWIN'S (424) case was that of a boy with exophthalmus. A myxomatous fibro-sarcoma of the optic nerve was removed by Krönlein's method with preservation of the ball, which was, however, sightless. HIRSCHMANN.

WEISS (426) removed by Krönlein's method a retrobulbar tumor which proved to be a cavernous angioma. The eyeball, which still had vision, was preserved. This operation, which should always be used in cases of tumor deep in the orbit, is also indicated when the orbit is to be entered for diagnostic purposes.

Occasionally after the operation the eye remains in a position of convergence, perhaps with limitation of its mobility outward in consequence of cicatrization in the depth of the orbital cavity. The hemorrhage is usually slight, but at times it is so great that the lids must be sutured over the ball and the cornea sometimes becomes ulcerated.

In BÖHM'S (427) patient, a woman who had previously suffered from acute nephritis, during normal labor pains one eyeball became prominent several times and six hours later again became prominent, with paralysis of all the muscles, complete blindness, and signs of cerebral irritation. The fundus was normal. The ball regained its mobility and normal position sixteen days later, but the optic nerve became atrophic. Nine months later the patient complained of a feeling of swelling in the upper lid, which she had experienced in former pregnancies, but the lid appeared normal. Although there was no suffusion of the conjunctiva, Böhm believed that there had been hemorrhage into the orbit.

Of WHITE'S (430) three cases of Basedow's disease, two without excessive exophthalmus were treated with extract of the thymus gland with relatively good results. The third case, with marked exophthalmus, was treated with extract of suprarenal capsule without perceptible improvement in the exophthalmus although there was subjective benefit. ABELSDORFF.

PETERS (431) describes cases in which the lachrymal sac seems to be dilated, but from which pressure or the delicate passage of sounds brings no pus, but this appears after the more forcible use of probes. These cases represent abscesses lying behind the sac which have broken through from empyemas of the frontal, ethmoidal, or maxillary sinuses.

In general, Peters recommends treating the nasal mucous membrane in all cases of disease of the sac. The affections of the sac found in the new-born are frequently due to an atresia of the opening of the duct in the nose, due to pressure on the duct. Secretion from the sac which cannot pass down into the nose on account of the atresia, but remains at the inner canthus, may simulate the secretions of a severe conjunctivitis or even a blennorrhœa.

In concluding, Peters describes two cases of vesicular eruption along the margin of the cornea, with a good deal of irritation and frequent recurrence, which were permanently cured only after the swollen nasal mucosa had been treated.

The patient whose history HUNTER (432) gives was a woman with an antecedent history of syphilis and iritic adhesions in both eyes. The right eye failed suddenly and its mobility was almost abolished. No ptosis. O. S. nil. Later ptosis developed and anæsthesia of the cornea, and during the long course of the disease the epithelium became disturbed. The nerve head became gradually atrophic and vision reduced to p. l. but the mobility returned. The medication was heavy doses of the iodide, 540 grains a day being administered for many months consecutively. In ten months it is estimated she took twenty pounds. No harm seems to have come from its use.

BURNETT.

NOYES (433) relates the histories of three cases of ethmoiditis, all of which were treated at first as abscess of the lachrymal sac. In all, drainage through the nose was established after a thorough curetting of the cells. Cure resulted in all cases.

BURNETT.

The case described and pictured by BURNETT (434) was a negro who was thrown violently on the head, making a fracture of the frontal bone on the right side and great pressure on the left eye. When seen by Burnett some weeks after, there was a sinking of the left eye in the orbit, it being quite a centimetre behind the other eye; paresis of all the muscles of the eye, motion downward being entirely lost; orbicularis intact, but levator restricted. Fundus was normal, except for evidences of hemorrhages in the retina. Cornea healthy; pupil clear. L. V fingers at $2\frac{1}{2}$ metres; R. nil on account of hemorrhages in the vitreous.

BURNETT.

The case of BRUNS (435) was a healthy-looking white boy of four years who had a swelling—like an abscess—of the edge of the right upper lid, with chemosis of the conjunctiva. As an exploratory incision showed a suspicious-looking mass instead of pus, the lid and content of the orbit were removed. The growth recurred in the orbit and eight and one half months after the operation the child died. Alt, who examined the specimen, found it to be a spindle-cell sarcoma of the orbit which had evidently sprung from the posterior portion and supplanted all the tissues

there except the muscles. The optic nerve was atrophic and œdematous. BURNETT.

BRUNER (436) gives the clinical history in great detail of a case of septic thrombosis of the cavernous sinuses beginning in the right and in a few days extending to the left eye, brought about by a disease of the alveolar process on the right side. It does not appear that the antrum was at any time affected. There was great swelling of the lids and orbital tissues, causing exophthalmus with all the symptoms of pressure on the nerves. There was total blindness, as the result of this compression, before death. The general septic symptoms were very severe. He died on the fifteenth day. No post-mortem could be obtained.

BURNETT.

XI.—CONJUNCTIVA.

437. MAZZA. Argyrosis of the conjunctiva following the use of nitrate of silver used as a dye for the hair and beard. *XV. Italian Ophthal. Congress*, Turin, 1899.

438. BATTEN. Chronic œdema of the conjunctiva associated with disease of the middle ear. *Lancet*, p. 958, 1899.

439. KAMEN. On the etiology of epidemic inflammations of the conjunctiva. *Centralbl. f. Bacteriol.*, xxv., 12–13.

440. KAST. An epidemic of acute contagious conjunctivitis. *Ibid.*, 13.

441. FRAENKEL. On the presence of the meningococcus intracellularis in purulent inflammations of the conjunctiva. *Zeitschr. f. Hygiene u. Infections-Krankheiten*, xxxi., 1899.

442. HOFFMANN. On conjunctivitis due to the diplobacillus. *Graefe's Archiv*, xliii., 3, p. 638.

443. SCHAEFFER. A case of diphtheritic conjunctivitis, interesting in its development, accompanying symptoms, and therapy. *Zehender's klin. Monatsbl.*, xxxvii., p. 258.

444. BIETTI. Typical blennorrhœa neonatorum due to the bacterium coli commune. *Zehender's klin. Monatsbl.*, xxxvii., p. 311.

445. HIRSCHBERG, I. Remarks on operation for and the anatomy of trachoma. *Berl. klin. Wochenschr.*, 1899, No. 39, p. 849.

446. SACHS. A case of pemphigus of the conjunctiva. *Wiener klin. Wochenschr.*, 1899, No. 24, p. 671.

447. KRAUSE. On infantile xerosis of the conjunctiva with keratomalacia. *Inaug. Dissert.*, Jena, 1899.

448. SCHAPRINGER. Congenital duplicatures of the palpebral conjunctiva—a hitherto undescribed typical malformation of the human eye. *Zeitschr. f. Augenheilk.*, 1899, ii., 1, p. 41.

449. FALCHI. A congenital anomaly of the sclero-conjunctiva and the cornea. *Arch. f. Augenheilk.*, xl., 1, p. 68.

450. KROLL. On cysts of the bulbar and palpebral conjunctiva. *Inaug. Dissert.*, Greifswald, 1899.

451. DE BERARDINIS. On a peculiar form of symblepharon. *Ann. di Ottalm.*, xxviii., 1.

452. LOBANOFF. A subconjunctival dermoid. *Wjest. Ophth.*, 1899, Nos. 4-5.

453. LOBANOFF. Lymphoma of the conjunctiva. *Ibid.*

454. VOLLARO. Lympho-sarcoma of the plica semilunaris. *Ann. di Ottalm.*, xxviii., 1.

455. EAGLETON. Report of a case of accidental inoculation of the eyeball with vaccine virus. *Ophth. Record*, July, 1899.

MAZZA (437) found marked argyrosis of both conjunctivæ without the involvement of any other parts, after the use of nitrate of silver as a hair dye. Nitrate of silver had never been used in any other way. KRAHNSTÖVER.

BATTEN (438) treated a man of thirty-three for an œdema of the eye for a period of some months without result. After removal of a large polypus which had perforated the left membrana tympani, and local treatment of the ear, the œdema of the conjunctiva disappeared. Batten believed that there was an obscure yet causative relation between the affection of the middle ear and that of the orbit and eye. ABELSDORFF.

KAMEN (439) found that an epidemic of acute conjunctivitis was due to the Weeks bacillus. The microscopic appearances were identical with those described by others, but the cultures did not correspond so closely to previous descriptions. Pure cultures of this bacillus, like those of the influenza bacillus, were best obtained by using Pfeiffer's blood-agar as a medium. The morphological and biological peculiarities of the Weeks bacillus make it seem probable that it belongs to the group of influenza bacilli. These bacilli are not resistant and are difficult to grow in cultures. For animals they seem to be pathogenic in but small degree.

In conjunction with the previous paper is one by KAST (440) in which the clinical symptoms observed in this epidemic are described.

FRAENKEL (441) found the meningococcus intracellularis (Weichselbaum) to be the cause of pseudo-membranous conjunctivitis in three cases. This coccus, which often resembles the gonococcus, gives up the stain, when Gram's method is used, very slowly and irregularly. Fraenkel believes that cultures are necessary to distinguish it absolutely from the gonococcus.

HOFFMANN (442) in Greifswald found diplobacilli in about half of one hundred cases of conjunctivitis in which he examined the secretion. In one case there was quite acute muco-purulent conjunctivitis, and in two there were complicating corneal ulcers. Weak solutions of sulphate of zinc always caused a rapid recovery.

In SHAEFFER'S (443) case, a week after a fall on the face diphtheria of the conjunctiva and the rhino-pharynx appeared, but yielded in three days to injections of Behring's serum No. III.

In a case of blennorrhœa of the new-born that appeared to be gonorrhœal, BIETTI (444) found only the bacterium coli, whose reactions he describes in detail.

HIRSCHBERG (445) does not favor excision of the retrotarsal folds in trachoma because the danger of relapse remains and the danger to the cornea is increased. He has never seen unfavorable results follow expression with the roller forceps. He performs excision of the retrotarsal fold in cases of circumscribed hard granulations that have resisted other forms of treatment; the case he cites, however, is certainly not one of trachoma.

SACHS'S (446) patient, a man of twenty-five, had suffered for five years from pemphigus which, in the last four years, had affected the conjunctiva and cornea. The vesicles led to ulceration, and now the cornea and conjunctiva are cicatricial. Vision is reduced to the ability to count fingers.

KRAUSE (447) made a microscopic examination of the eyes of a child of five, in whom a xerosis of the conjunctiva with an ulcer of the cornea was in process of healing. In the conjunctival epithelium, as well as in the ulcer, he found microörganisms which he regarded as having caused the disease by ectogenous infection.

SCHAPRINGER (448) found several duplicatures of conjunctiva extending from the retrotarsal fold to the tarsus in a case in

which externally the appearance of the eye was normal. He regarded these as congenital amniotic adhesions.

FALCHI (449) describes a teratoid tumor of the sclero-corneal junction which was composed of elements of the retrotarsal folds, goblet cells, glands, vessels, nerve endings, etc.

KROLL (450) divides the cysts of the conjunctiva as follows: 1. Congenital, (*a*) with microphthalmus, (*b*) dermoid, (*c*) cysts arising from the nasal mucosa, (*d*) meningoceles. 2. Of spontaneous origin, (*a*) lymph cysts, (*b*) simple serous cysts of the bulbar conjunctiva, (*c*) cysts arising from Krause's glands, (*d*) in pterygia. 3. Of traumatic origin, (*a*) simple, (*b*) from hematoma, (*c*) after perforating wounds of the ball. He classifies in this order the reports in the literature, and adds three new cases with microscopic examination.

A peculiar form of symblepharon was seen by DE BERARDINIS (451) in a child of five, which had followed a severe conjunctival inflammation at the age of six months. A grayish-red membrane passed from the convex margin of the upper tarsus to the corresponding margin of the lower, its outer free border being hidden beneath the outer commissure, its inner leaving a considerable portion of the cornea free. Beneath this membrane the eye was freely movable, and the conjunctival sac, both above and below, was of normal depth. The length of the membrane is sufficient to allow a moderate opening of the lids. After its removal the eyeball and conjunctiva appeared to be in every respect normal. It was found that at the beginning of the inflammation the hyperæmic conjunctiva had been rubbed with the rough leaf of a certain plant, after which the eye was left to itself. An adhesion then took place between the swollen lids, and as the inflammation passed off the adhesion was drawn out into the membrane described. KRAHNSTÖVER.

LOBANOFF'S (452) dermoid was situated beneath the conjunctiva, temporally and above, and was symmetrical in the two eyes. HIRSCHMANN.

LOBANOFF (453) found two tumors on one eye, one on the bulbar conjunctiva near the outer commissure, the other in the upper retrotarsal fold. Both proved to be small-celled lymphomata with scanty interstitial substance. HIRSCHMANN.

In the case reported by EAGLETON (455), a physician, while vaccinating a child, accidentally broke the glass tube and a part of its contents flew into his eye. On the third day he had some

fever and much discomfort in that eye. An examination showed a bleb on the conjunctiva of the ball about 2 *mm* from the limbus on the outer side. It was filled with a yellowish fluid. It was evacuated and an antiseptic wash used. The temperature went down in a day or two and no further trouble was experienced. The physician had been successfully vaccinated in youth, and unsuccessfully several times since. BURNETT.

XII.—CORNEA, SCLERA, AND ANTERIOR CHAMBER.

456. HAUKE. Opacity of the cornea from nitro-naphthalin. *Wiener klin. Wochenschr.*, 1899, No. 27.

457. HAAB. On grill-like (gittrige) keratitis. *Zeitschr. f. Augenheilk.*, 1899, ii., 3.

458. MANZ. Parenchymatous keratitis with demonstration of fluorescin staining. *Münch. med. Wochenschr.*, No. 32, 1899.

459. BIHLER. On the diagnosis of endothelial affections of the cornea by means of fluorescin, particularly in beginning sympathetic ophthalmia. *Ibid.*

460. BAAS. On dendritic keratitis and its relation to herpes of the cornea. *Inaug. Dissert.*, Giessen, 1899.

461. KOSTER. A case of zona ophthalmique with interstitial keratitis but without epithelial lesions. *Ann. d'ocul.*, 1899, Feb.

462. FLEMMING, PERCY. A case of ophthalmic herpes with hypopyon keratitis. *Lancet*, 1899, p. 587.

463. FROMAGET. Severe and early ocular syphilis; paralysis of the third pair and interstitial keratitis. *Ann. de Policlinique de Bordeaux*, 1899, No. 4, p. 57.

464. BAQUIS. On the nature and genesis of the various hyaline formations of the cornea. *Report of the Fifteenth Italian Ophth. Congress*, Turin, 1899.

465. DE WECKER. Aseptic tatooing of the cornea. *Arch. f. Augenheilk.*, xxxix., 4, p. 375.

466. KRUCKENBERG. Bilateral congenital melanosis of the cornea. *Zehender's klin. Monatsbl.*, xxxvii., p. 254.

467. JARNATOWSKI. Delay in cicatrization of the corneal wounds after cataract extraction. *Arch. d'opht.*, xix., 7, p. 429.

468. FRIEDLAND. The pathological anatomy of scleritis. *Graefe's Archiv*, xliii., 2, p. 283.

HAUKE (456) found in a worker in naphthalin the same corneal changes that Frank described (*Beiträge f. Augenheilk.*, 31). Without signs of inflammation a delicate horizontally oval opacity formed in the middle of the cornea, dependent upon a superficial alteration in the epithelium. Within a period of two years the cornea became normal again.

HAAB'S (457) grill-like keratitis is a rare affection which begins as a faint central opacity without much disturbance of vision or circumcorneal injection. By transmitted light the opacity is seen to consist of forked lines and of points scattered among them, giving first the effect of grill-work and later of a densely opaque spot.

The surface of the cornea is roughened, but no vessels are present. The process is apparently a degenerative one—a deposition of hyalin in the deeper layers of the corneal epithelium and later in Bowman's membrane and the underlying substantia propria, for after scraping off the epithelium the grill-like figures remain. This keratitis is a family affection.

BIHLER (459) reports an investigation undertaken to determine the degree to which fluorescin may stain the deeper portions of the conjunctiva while the epithelium is intact. In a case of iritis, three days before the outbreak of marked symptoms a small area of endothelium could be stained and this daily grew larger. In parenchymatous keratitis Bihler's results did not accord with those of v. Hippel. Precipitations on the posterior surface of the cornea did not take the stain. In cases of sympathetic irritation, as well as in iritis, fluorescin aids in making an early diagnosis. His patient had suffered an injury to the left eye, and twelve days later there was complaint of irritation of the right eye, although all objective signs of sympathetic inflammation were wanting and vision was but slightly affected. Nevertheless a central area of endothelium as large as the lens took the green stain.

Following a herpes of the face there developed in FLEMMING'S (462) patient a herpes of the cornea with a spreading ulcer and a collection of pus in the anterior chamber. A wrong diagnosis having been made, the ulcer was cauterized with carbolic acid and the conjunctiva treated with nitrate of silver, and the ulcer progressed. When the neuropathic nature of the affection was recognized, the lids were sutured together and hot fomentations were used. With this treatment the ulcer soon healed.

ABELSDORFF.

FROMAGET's (463) patient, a year after infection with syphilis, suddenly had a total left oculomotor paralysis, due, in the author's opinion, to a hemorrhage compressing the nerve trunk. After a month the paralysis gradually diminished, leaving only slight functional defects. An iritis then developed accompanied by a vascular infiltration of the cornea—a partial interstitial keratitis which passed off in a month and a half under treatment with mercury and iodide of potassium. This prompt reaction to treatment, the unilateral nature of the affection, and the relative absence of irritation led the author to characterize it as a case of interstitial keratitis due to acquired syphilis.

BAQUIS (464) holds the opinion that the yellow globular masses found in old leucomas are of epithelial origin, although he would not rule out absolutely other sources of origin. Whether they are of hyaline or colloid nature is still undetermined. KRAHNSTÖVER.

DE WECKER (465), commenting on v. Sicherer's paper (*Archiv f. Augenheilk.*), states that with his best India ink rubbed up in 1:2000 bichloride he has never seen signs of irritation following tattooing. When the tattooing is done for optical purposes, for which it is done too rarely, instead of fixing the eye with a speculum and forceps this should be done with the fingers.

KRUCKENBERG (466), in a woman of forty-five, with an otherwise normal anterior segment of the eyeball, found in the deeper layers of each cornea before the pupil an oval spot of the same brown color as the iris, composed of a finely granular mass and appearing in transmitted light as a very faint opacity causing no distortion of images. The author believed it to be congenital.

After reporting a case in which the anterior chamber remained open for several days after an extraction and only closed when the dressings had been left off for two days, JARNATOWSKI (467) discusses the causes of this late closure. Apart from incarceration of capsule, conjunctiva, or blood clots, the principal cause is an irregularity of the section. An improper bandage or entropium of the lower lid may favor the remaining open of the lid, as may also atropine and cocaine by disturbing the nutrition of the tissues, while diabetes and albuminuria are by some wrongly reckoned as causes. If the wound remains open long the epithelium extends over the edges and hinders closure. The treatment consists in rest and proper bandaging. Iridectomy may be done. In one case the passage of a spatula between the lips of the wound was sufficient. v. MITTELSTÄDT.

FRIEDLAND (468) presents the clinical histories and microscopic examinations of two eyes with non-suppurative scleritis of the anterior segment with foci of necrosis. In both cases there was an accompanying choroiditis.

Sections XIII.–XVIII. Reviewed by DR. O. BRECHT, Berlin.

XIII.—LENS.

469. ZELLER. On cataract and diabetes. *Inaug. Dissert.*, Tübingen, 1899.

470. LEVINSOHN. A contribution to the operation for secondary cataract. *Centralbl. f. prakt. Augenheilk.*, xxiii., p. 207.

471. PERETTI. A case of bilateral symmetrical luxation of the lens after injury of the skull. *Zeitschr. f. Augenheilk.*, ii., p. 225.

472. KAEMPFFER. Congenital coloboma of the lens. *Graefe's Archiv*, xlviii., p. 558.

473. CHANDLER. Capsular cataracts. *Ophth. Record*, Sept., 1899.

ZELLER (469) reports on 56 cases of cataract with diabetes. One patient was under twenty years of age, 4 between twenty and thirty, 6 between thirty and forty, 7 between forty and fifty, 17 between fifty and sixty, 19 between sixty and seventy, and 2 over seventy. There were 25 men and 31 women. The amount of sugar varied between a faint trace and 6 per cent. The author classes as diabetic cataract only such as develop like the soft cortical cataract of young persons. In these cases the cataract forms quickly, usually in both eyes at the same time, the lens swells, the anterior chamber is shallow, the patient is usually young, and there are present other diabetic manifestations in the eye. These conditions were found in 32 per cent. of Zeller's patients. In 25 per cent. there was albuminuria also, and in 10 per cent. there was retinitis. In 42 cases extraction was done, which in 2 cases was followed by severe iritis. The results of the operations were not particularly good.

LEVINSOHN (470) has modified de Wecker's scissors so that they can be used both to perforate the cornea and to divide the secondary cataract. Practical use of the instrument has not yet been made.

KAEMPFFER (472) in a comprehensive paper gives a *résumé* of our knowledge of coloboma of the lens, describes a number of cases, and takes up the various theories as to the genesis of coloboma, concluding that no single explanation is sufficient.

CHANDLER (473) has found from his experience that the essentials of a proper operation on the capsule are good illumination and a sharp knife. To supply the former he has devised an electric-light apparatus whose focal distance can be regulated, and to this can be attached a pair of fixation forceps or a knife-needle—all being directly under the operator's control. The knife should be entered at the sclero-corneal junction and farthest away from the intended puncture through the capsule. A straight incision of proper length he has always found sufficient. He uses a sickle-shaped blade of medium size. BURNETT.

XIV.—IRIS.

474. GOLDZIEHER. Iritis glaucomatosa. *Centralbl. f. prakt. Augenheilk.*, xxiii., p. 257.

475. HEATH. The treatment of prolapse of the iris. *Ophth. Record*, Sept., 1899.

GOLDZIEHER (474) observed five patients who had suffered from iritis without any synechiæ remaining. After a year or two the iritis recurred with excessive fibrinous exudation. Atropine being used, there developed suddenly increased tension, cloudiness of the cornea, diminution of vision to perception of light, chemosis, and swelling of the lids. The glaucomatous attacks were cured by the use of pilocarpine or eserine. The author believes that the precipitated fibrinous masses choked the anterior channels of exit of the aqueous humor and thus set up a glaucoma from retention.

HEATH (475) contends for a very conservative treatment of prolapse of the iris, giving several cases in support of this policy, in which he will find himself supported by an increasing number of surgeons. Tinkering with a prolapsed iris even after cataract extraction is always a risky procedure. BURNETT.

XV.—CHOROID.

476. SILEX. The early diagnosis of sarcoma of the choroid. *Berlin. klin. Wochenschr.*, 1899, No. 32.

477. TERRIEN. Sarcoma of the choroid, complicated with phthisis of the eyeball. *Arch. d'opht.*, xix., No. 8, p. 471.

478. MARSHALL, DEVEREUX. Sarcoma of the uveal tract. *Ophth. Hosp. Reports*, xv., 1, May, 1899.

479. ALT. A case of early diagnosis of a choroidal sarcoma. Removal of the eyeball and examination. *Amer. Jour. of Ophth.*, Sept., 1899.

In a physician of fifty, who complained of scintillation only, SILEX (476) found a detachment of the retina, 2 × 3 p. d. in area and 1.33 *mm* high. There was myopia of 3.5 D, V = $\frac{4}{5}$, and no other pathological condition. A diagnosis of sarcoma was made. After enucleation there was found a firm, slightly pigmented sarcoma, with some round cells, and in some parts an alveolar structure. It was 6 *mm* long, 3 *mm* broad, and 1.5 *mm* high. It could not be determined from what layer of the choroid the tumor arose.

TERRIEN (477) describes the occurrence of phthisis bulbi with sarcoma, preceding or following the development of the latter, and reports cases. He agrees with other authors that the atrophy of a ball containing a sarcoma is caused by an infectious irido-choroiditis, which may check the further growth of the tumor. He does not consider the atrophy a favorable complication, since metastases may still take place and sympathetic ophthalmia is not rare. V. MITTELSTÄDT.

The paper by MARSHALL (478) consists of a report on a series of cases of sarcoma of the uveal tract.

The first part of the paper is a supplement to a tabulated record of 103 cases, published in the *Royal London Ophthalmic Hospital Reports*, vol. xiii., part 2, Dec., 1891, by Messrs. Lawford & Collins, and gives further information concerning these cases, which has been obtained since that date.

The second part is a similar report on fifty-eight cases which have been collected since 1891.

Two important points are brought out with regard to (1) the age of patients and (2) the tension of the eye.

(1) The greatest number of cases occurred between the ages of fifty and seventy; the youngest was a man of twenty-eight and the oldest a woman of seventy-four.

(2) In tumors of the choroid the tension was raised in 66.66 %; normal in 30.3 %; diminished in 3.03.

In tumors of the ciliary body the tension was raised in 25 %; was normal in 50 %; was diminished in 25 %. LISTER.

ALT'S (479) patient was a man of thirty-one years, who com-

plained of a "sparkling" and shadow before the left eye. V = $\frac{20}{30}$, with + 1.5. A scotoma, oval in form, to the temporal side, beginning 10° from the papilla and extending to the periphery; its vertical diameter was about 30°. Corresponding to this there was a raised portion of the retina, yellowish white, with red patches, the vessels passing over it slightly tortuous. In a month the subjective symptoms had somewhat increased, and the eye was enucleated. On examination, a flat tumor, 10 *mm* long by 7 wide and 3 in height, was found, with the retina firmly adherent to its apex; no exudation between tumor and retina. The tumor was densely packed with spindle cells, forming large bands, which crossed each other in all directions, with here and there aggregations. These cells contained at places pigment granules of various shades of brown. No return nineteen months after operation.

BURNETT.

XVI.—VITREOUS.

480. HESS. Fat in place of vitreous. *Seventy-first Meeting German Naturalists and Physicians*, Munich, Sept., 1899.

XVII.—GLAUCOMA.

481. SCHÜSSELE. On the relations of primary glaucoma to sex, age, and refraction, as shown in the patients of the Tübingen clinic *Inaug. Dissert.*, Tübingen, 1899.

482. BAJARDI. The general intra-arterial pressure in its relation to some ocular affections. *Report of the XV. Italian Ophth. Congress*, Turin, 1899.

483. HOLMSTRÖM. A case of migraine complicated with glaucoma, with some remarks on glaucoma. *Nord. med. Ark.*, 1899, No. 21.

484. BALL, RENAUD, and BARTLETT. Excision of the right superior cervical ganglion of the sympathetic for glaucoma. *N. Y. Med. Jour.*, July 1, 1899.

485. ALT. A case of glaucoma chronicum simplex in a girl of thirteen years of age, evidently induced by the instillation of atropin. *Amer. Jour. of Ophth.*, Sept., 1899.

486. BIZE. Glaucoma following supraorbital neuralgia of malarial origin. *N. Y. Med. Jour.*, Sept. 16, 1899.

SCHÜSSELE (481) has tabulated the 494 cases of primary glaucoma seen in the Tübingen clinic. They represent 0.73 % of the

total number of patients. Twice as many women were affected as men, 12% were under forty years of age, and 88% over forty. The inflammatory form was seen twice as often as the simple. 41.2% were hyperopic, 43.4% emmetropic, and 15.5% myopic, an increased disposition among the hyperopic not being manifest. The second eye was, as a rule, affected soon after the first, and usually at least within three years.

BAJARDI (482) found by a great number of measurements of the intra-arterial pressure in the radial artery that often a considerably increased intraocular tension may be present with normal arterial tension, and that quite as frequently the general arterial tension is increased in cases of subacute glaucoma. In inflammatory glaucoma the arterial tension was almost always high. KRAHNSTÖVER.

HOLMSTRÖM'S (483) patient was a woman of forty-seven who had suffered with regularly recurring attacks of glaucoma from her thirty-second year. She had observed recently that vision grew worse at each attack, and colored rings were seen. When the attack passed off vision became normal again. There were no objective signs of glaucoma. Some months later the patient appeared with the complaint that the vision of the right eye had become greatly diminished in the last attacks, and that it had not improved again. The right eye then showed pronounced glaucomatous changes. After an iridectomy, the glaucomatous signs disappeared, and in the following attacks vision did not become affected. The left eye remained unchanged at first—*i. e.*, with each attack of migraine disturbances of vision occurred but passed off again. A year and a half later glaucoma appeared in this eye also, and was relieved by two iridectomies. DALÉN.

In the case reported by BALL, RENAUD, and BARTLETT (484), a man of fifty-six, who was likewise deaf and dumb, had a chronic glaucoma in the right eye of the typical sort with T + 3. Complained of pain in and around the eye. The right superior cervical sympathetic ganglion was removed by cutting down along the sterno-mastoideus, exposing the jugular vein, and tying it. The trapezius was then separated from the sterno-mastoideus and the spinal accessory cut. A deep dissection exposed the carotid sheath. This was opened and the pneumogastric exposed. This was pulled forward so as to bring into view the rectus capitis anticus major muscle on which the ganglion

rests. It was stripped and cut, dividing all the fibres. Tension was reduced to + 1. BURNETT.

ALT (485) saw the girl, whose history he gives, when she was eighteen, at which time she was suffering from a complete chronic simple glaucoma in the right eye (V = o) and one of less degree in the left (V = $\frac{20}{200}$ and a much restricted oval-shaped field). The trouble dated, according to the history, from the application of atropine for testing refraction, five years before. BURNETT.

BIZE (486) relates a case of periodically recurring attacks of glaucoma which were finally dissipated by large doses of quinine. BURNETT.

XVIII.—SYMPATHETIC OPHTHALMIA.

487. GRUENING. A case of corneal wound with prolapse of the iris followed by sympathetic ophthalmia. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1899.

488. MARPLE. Microscopic examination of a globe with a corneal wound and prolapse of the iris which caused sympathetic ophthalmia in the other eye. *Ibid.*

The patient, whose history GRUENING (487) records, was a girl of five years who had a horizontal corneal wound made by a piece of glass. The iris was prolapsed into the wound when seen two days after. An offer to excise the iris was refused by the parent. Twenty-three days after, the child was presented with a full-blown sympathetic cyclo-iritis in the fellow eye with a profound inflammation in the eye injured. Enucleation was not allowed, but an effort was made to free the iris from the wound. Finally enucleation was agreed to. Vision in the sympathetic eye was, some weeks after, $\frac{1}{10}$. BURNETT.

This is a report by MARPLE (488) of an examination of the eye removed in the case reported by Gruening in the same number. He found the original wound confined entirely to the cornea, its end on the nasal side being 1.5 *mm* from the scleral border. The iris and ciliary body were densely infiltrated with round cells, as was the optic nerve whose sheath was distended. BURNETT.

Sections XIX.–XXII. Reviewed by PROF. GREEFF, Berlin.

XIX.—RETINA AND FUNCTIONAL DISTURBANCES.

489. SCIMENI. On a peculiar pigmentation of the fundus. *Report of the XV. Italian Ophth. Congress*, Turin, 1899.

490. GAUDENZI. Three cases of grave amblyopia following the suturing together of the lid in infancy. *Trans. XV. Italian Ophthal. Congress*, Turin, 1899.

491. PICK. A contribution to the subject of tortuosity of the vessels. *Arch. f. Augenheilk.*, xxxix., p. 382.

492. GIFFORD. Blindness from drinking methyl alcohol. *Ophth. Record*, Sept., 1899.

493. MOULTON. A case of amblyopia due to the use of methyl alcohol. *Ibid.*, July, 1899.

494. REIK. Typical diabetic retinitis. Report of two cases. *Annals of Ophth.*, July, 1899.

SCIMENI (489) believes that many forms of chorio-retinitis occurring in patients with syphilis are confounded with retinitis pigmentosa. He would consider them to be due to syphilis purely. KRAHNSTÖVER.

GAUDENZI'S (490) three observations of grave amblyopia after the lids had been closed for years by operation in cases in which the eye externally and internally appeared healthy, led him to believe in an amblyopia ex anopsia. KRAHNSTÖVER.

GIFFORD (492) reports two cases of blindness after the ingestion of wood alcohol. In Case I. a man of forty-five years drank a half-pint of a mixture containing two-thirds water and one-third wood alcohol. The next day his head felt sore and confused, and he took another drink of the same. On the second day he vomited the whole night; the next morning objects looked foggy. Vision diminished, and on the second day after—the fourth after the first ingestion—he was totally blind. When seen twenty days after the drinking, the disks were decidedly atrophic, eyes otherwise normal. In ten days V began to return slightly so as to enable him to count fingers at a few feet. Outer fields normal for white, but a central scotoma. This remained for about a week, after which V began to go, and in a few weeks was reduced to perception of movement in one eye and fingers at four feet in the other. The vessels of the retina became gradually narrower. Case II. Two men drank of a mixture of water and wood alcohol, one freely. The latter became wildly excited, with rapid respiration but no fever, and was found blind at the end of twenty-four hours, and two hours after this died. BURNETT.

MOULTON (493) reports that a man, together with some thirty or forty others, drank wood alcohol; five of them, including the

patient, taking about one half-pint each. All were ill, and two died in the course of twenty-four hours. Two recovered perfectly. The patient became weak but not unconscious. The day following the drinking, the sight became affected, and in a few hours was lost entirely. In a few days some sight returned, and this he still has. R, p. l.; L, fingers at one foot; no color perception; central scotoma 10° by 20°, surrounded by a clear zone of 20° by 10° horizontal. Atrophy of nerves of both eyes, and nerves in right vessels mere threads. BURNETT.

REIK (494) gives the histories of two cases of retinitis associated with diabetes, in which in one case what is considered the typical yellowish-white dots were seen near the temporal margin of the disk; and in the immediate vicinity of the macula was found a round white atrophic patch, and near by two or three small hemorrhages. In the other there were no hemorrhages, but the white dots were present in one eye in great numbers; in the other eye the disease was less pronounced. BURNETT.

XX.—OPTIC NERVE.

495. GERMANN. A case of tumor of the optic nerve. *Zehender's klin. Monatsbl. f. Augenheilk.*, xxxix., p. 319.

496. HEINE. Sarcomatous metastasis in the nerve head. *Ibid.*, p. 326.

497. HIGGENS, CHARLES. Notes on a case of unilateral neuritis. *Lancet*, 1899, p. 1083.

498. DE LAPERSONNE. Optic neuritis associated with affections of the sphenoid and the posterior portion of the nasal fossæ. *Arch. d'opht.*, xix., 9, p. 513.

499. NETTLESHIP. Retrobulbar optic neuritis. *London Ophth. Hosp. Reports*, xv., 1, p. 1.

500. POSEY. A report of a case of complete monocular blindness following an injury to the head, attended by full restoration of vision. *Philadelphia Med. Journ.*, Aug. 19, 1899.

GERMANN'S (495) patient was a girl of eighteen. Her left eye had gradually grown prominent for two years, and finally vision was lost. The tumor was removed from before together with the eye. Behind the ball an enlargement of the optic nerve was found which passed over into a large dense tumor mass which filled the entire orbit. Then the tense grayish-blue wall of the

tumor appeared traversed by numerous vessels. Microscopically the tumor proved to be an angiosarcoma with foci of myxomatous degeneration.

HEINE's (496) interesting case of sarcoma metastasis of the disk is unique in the literature. The tumor was seen ophthalmoscopically in life, and was supposed to have proceeded from pulmonary metastases of a sarcoma of the back.

HIGGENS's (497) patient came under treatment with a neuritis of the right eye. The cause was first thought to be carious teeth, and these were removed, but without effect. The general condition became worse, and blindness of the right eye was followed by loss of vision in the left while the ophthalmoscopic picture remained unchanged. Only in the last days of life did a slight hyperæmia appear. At the autopsy there was found basilar meningitis, and marked swelling of the optic nerves and chiasm, with secondary atrophy. ABELSDORFF.

DE LAPERSONNE (498) reports observations of unilateral choked disk following affections of the ethmoid and sphenoid sinuses but not being accompanied by the usual signs of the latter affections, such as severe neuralgia, photophobia, spasm of the lids, and erysipelatous redness of the skin over the bridge of the nose. In the first case there was a sarcoma of the sphenoid with infection of the sinus, in the second a suppuration in the upper posterior portions of the nasal cavities, and in the third a suppurative inflammation of the rhino-pharyngeal cavity. In all these cases the choked disk remained unilateral and was to be regarded as an infection neuritis. v. MITTELSTÄDT.

NETTLESHIP (499) gives a provisional classification of cases of retrobulbar optic neuritis, and the notes of a number of interesting cases which illustrate the different types.

I. *Idiopathic Family*—where the disease starts in the nerve itself.

II. *Symptomatic Family*—where the disease is communicated to the nerve by the surrounding tissues.

Of the idiopathic family two groups may be distinguished:

(*a*) That in which only *one* optic nerve is affected, which forms by far the largest class.

(*b*) That in which *both* optic nerves are affected.

He further divides group (*b*): 1. Cases which resemble group (*a*), but suffer one or more subsequent attacks like the first, and affecting the same eye or alternating between the two; and which

are complicated by loss of power or sensation in the limbs, that may be temporary, but often settles down into something permanent. (2) Cases characterized by rapid failure of one eye, followed shortly by similar failure of the other, and by quick and good recovery of both, without nerve complication or recurrence of blindness. The *onset* of the disease is rapid but not sudden; thus distinguishing it from embolism or arterial thrombosis or possible hemorrhage into the sheath.

The *field* is invaded in various degrees, but the central part is always affected, the scotoma often spreading out into a fan from the fixation point, but not in the same sector of the field in all cases. In hysterical amblyopia a central scotoma is very rare, but an interesting case is recorded in which it was present.

The *light sense* is impaired.

Spontaneous *pain*, or pain caused or increased by movement or pressure on the globe, is a very common sign, and it usually precedes the loss of vision, and ceases when or soon after this occurs.

The direct reflex action of the *pupil* to light is lowered.

Ophthalmoscopic changes in the idiopathic group are usually present almost from the first, though they may be slight; whilst in some of the worst symptomatic cases no change whatever can be detected in the disk for some weeks. Later on there is almost always pallor of the disk.

It is a disease of the most sexually active period of life, it being most frequently met with between the ages of twenty and forty, and during that period women are more than twice as subject to it as men.

Amongst the causes, exposure to cold, gout, influenza, typhoid fever, and malaria are mentioned; syphilis very rarely is the cause in the idiopathic group, but accounts for at least one half of the symptomatic cases Nettleship has collected. There is often also a history of marked functional or organic disease of the nervous system. It may be easy or difficult to distinguish between an idiopathic and a symptomatic case. In the symptomatic family, pain when it occurs is worse and more lasting; the ophthalmoscopic changes are delayed; paralysis of the cranial nerves and signs of bone disease at the base are fairly common; whilst in the idiopathic family symptoms of chronic disease of the brain or spinal cord are far less frequent.

Prognosis for sight in the idiopathic family is good on the

whole, but an attack of acute retrobulbar neuritis, single, or, if double, with much delayed symmetry and generally ending in partial or complete recovery, should always cause anxiety as to the future onset of *disseminated sclerosis* or some other disease of the cord—not tabes.

In the symptomatic group the prognosis is usually less hopeful.

In the case reported by POSEY (500) a man was struck over the left eye by the head of a child in play. The man was stunned and suffered much pain at the time, but in a few hours recovered. At the end of thirty-six hours the pain returned and vision began to fail as if a veil had dropped before his eyes from above downward. At the end of the fifth day he was totally blind. The nerve head was paler than its fellow and there was a venous pulse, the veins for some distance from the disk totally collapsing at each diastole of the heart. No arterial pulsation. Under vigorous treatment of rest, leeches, purgation, and diaphoretics he began to have a return of vision, which progressed until at the end of a week it reached normal, the last to disappear being a central scotoma. Posey is inclined to locate the lesion at the roof of the sphenoid cells, and due to inflammation rather than an effusion of blood. BURNETT.

XXI.—INJURIES, FOREIGN BODIES, PARASITES.

501. CRAMER. On an iron splinter in the eye. *Zeitschr. f. Augenheilk.*, ii.

502. LEWINSOHN. On the removal of foreign bodies from the cornea. *Berl. klin. Wochenschr.*, 1899, No. 37.

503. UHTHOFF. Demonstration of two remarkable cases of magnet operation on the eye. *Allg. med. Central-Zeitung*, 1899, No. 57.

504. UHTHOFF. A case of unilateral retinitis from the glare of an arc light, followed by traumatic neurosis. *Zeitschr. f. Augenheilk.*, ii.

505. TORNATOLA. A note on the therapy of shot injuries of the eye. *Report of the XV. Italian Ophth. Congress*, Turin, 1899.

506. SCIMENI. Subretinal cysticercus. *Ibid.*

507. DE VINCENTIIS. On a cysticercus in the vitreous. *Ann. di Ottalm.*, xxviii., 1.

508. KENNON. A report of sixteen cases of foreign body (iron or steel) in the globe. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1899.

509. BICKNELL. Foreign body in the iris. *Ophth. Record*, July, 1899.

510. SNELL. On the removal of a fragment of steel from the retina with the electro-magnet. *Brit. Med. Journ.*, 1899, p. 335.

CRAMER (501) reports an interesting case of iron splinter in the eye. The foreign body had entered the upper part of the lens, and later, as the traumatic cataract progressed, it sank down to the lower part. The brown lens masses gave the iron reaction with ferrocyanide of potassium and hydrochloric acid. At the time of operation the iron present in the lens was in an oxydized form and was not affected by the magnet. After extraction, vision with the correcting glass was $\frac{1}{10}$.

In UHTHOFF'S (503) first case it was remarkable that a bit of iron weighing only 0.006 caused a visible deflection of the needle in Asmus's sideroscope. Although the lens was perforated by the foreign body a total cataract did not develop, and the opacity first caused diminished somewhat, leaving $V = \frac{1}{3}$.

UHTHOFF'S (504) patient, a man of thirty-three, was inspecting an arc light and had his right eye closed. Suddenly without warning the current was closed, and immediately the patient saw a dark spot in the field of the left eye, and became dizzy. A relative scotoma was found extending about 10° from the point of fixation, and there was slight metamorphopsia. Ophthalmoscopically a number of yellowish-red points were found scattered about the macular region. The excitation threshold (Förster's photometer test) was but slightly altered in the region of the scotoma, but the perception of minimum differences in luminosity (Mascan's disk test) was much lessened. It was noteworthy that a traumatic neurosis appeared afterwards.

TORNATOLA (505) regards all shot injuries of the eye as antiseptic, the entering foreign body being sterile. The only danger lies in a secondary infection of the wound, and therefore when the perforation has taken place through the sclera the conjunctiva should be sutured over it. KRAHNSTÖVER.

SCIMENI (506) successfully removed a cysticercus from the eye. The diagnosis was made early with the ophthalmoscope, and the parasite which lay beneath the retina could easily be removed. The retina became attached again, and the ophthalmoscopic

picture was normal except at the spot where the cysticercus had been. Vision improved from $\frac{1}{60}$ to $\frac{1}{2}$. According to the author's belief, an operation is always indicated, since spontaneous recovery does not take place, in his opinion. KRAHNSTÖVER.

In DE VINCENTIIS'S (507) case a cysticercus in the vitreous was followed from its first appearance, the patient refusing to have it removed. When finally the eye was enucleated two cysts were found in the vitreous, one small without a trace of a parasite, the other five times as large, containing the fully developed living parasite. From the microscopic conditions of the cysts and adjacent vitreous, the author concludes that the cysticercus first occupied the smaller cyst and thence migrated to the other. The cause of the migration would seem to have been the thickness of the wall of the first vesicle which allowed the parasite no room for growth. In cases in which the wall cannot be pierced the parasite dies. Thus are to be explained the observations of encapsulated cysticerci. KRAHNSTÖVER.

KENNON (508) gives the histories, in more or less full detail, of sixteen cases of pieces of iron or steel removed from the eye. Where the foreign body is in the vitreous, the chances for eventual vision are bad. In only one case was it $\frac{5}{200}$. Where the foreign body is in the anterior chamber, the prognosis is very favorable for a return of vision eventually to the normal. The same is true in a degree when the body is in the lens. He considers the Haab magnet safer than the forms of instrument that have to be introduced into the eye. Some of these cases (six) have been reported before. BURNETT.

The foreign body in the iris in the case reported by BICKNELL (509) was a bit of stone, 2 × 1 *mm*, adherent to the anterior iridic surface close to the pupillary margin. The pupil was small and rigid. It had entered the eye some nineteen years ago. V = $\frac{3}{20}$, and no complaint. BURNETT.

SNELL (510) was able to remove through a scleral incision a splinter of steel which had passed through the iris and entered the retina without causing opacity of the media. Vision rose to $\frac{6}{9}$, and only a small scotoma corresponding to the point of injury remained.

XXII.—OCULAR AFFECTIONS IN GENERAL DISEASES.

511. WINTERSTEINER. A case of metastases in the ocular muscles from a carcinoma of the breast. *Klin. Monatsbl.*, Sept., 1899.

512. HIRSCHL. On the sympathetic pupillary reaction and on the paradoxical light reaction of the pupils in progressive paralysis. *Wiener klin. Wochenschr.*, 1899, No. 22.

513. KOENIG. Alternating mydriasis in a case of cortical cerebral paralysis. *Deutsche Zeitschr. f. Nervenheilkunde*, XV.

514. SARADETH. A case of puerperal metastatic panophthalmitis. *Münch. med. Wochenschr.*, 1899, No. 11.

515. BELILOWSKY. On the influence of the genital apparatus in the woman on diseases of the eye. *Wjest. Ophth.*, 1899, 4–5.

516. BOCCHI. Nicotine and alcohol amblyopia. *Report of the XV. Italian Ophth. Congress*, Turin, 1899.

By alternating mydriasis we understand a dilatation of the pupil which alternates in the two eyes. KOENIG (513) reports a case occurring with cerebral paralysis in childhood — a disease with which this phenomenon has not been seen previously. Reaction to light and in convergence were normal. From a consideration of the literature and his own cases he comes to the following conclusions:

Alternating mydriasis is a rare phenomenon observed both when pupillary reaction is normal and when it is abnormal.

It is observed chiefly in cases of organic disease of the central nervous system, less frequently in cases of functional disturbances, and very rarely in persons who have no nervous affection.

If the pupillary reaction is normal and there are no other indications of organic nervous disease, the presence of alternating mydriasis is not to be considered necessarily of bad portent.

When there is a difference in the width and in intensity of reaction in the two pupils, as in unilateral reflex iridoplegia, an alteration in the general illumination may produce what to the superficial observer would seem to be this phenomenon (pseudo-alternating mydriasis).

HIRSCHL (512) presents observations on the sympathetic pupillary reaction in cases of mental disease, and the paradoxical light reaction of the pupils.

By sympathetic reaction we understand the dilatation of the pupils due to excitation of the sensory nerves. The test is made by pricking or pinching the cheek or by applying a moderately strong faradic current to any portion of the body, when usually the pupil dilates promptly. The author found that in patients with mental disorders, apart from progressive paralysis, the

sympathetic reaction was almost always present, being absent only in cases of chronic alcoholism.

In paralytics the sympathetic reaction was almost always absent when there was Argyll-Robertson pupil. The sympathetic reflex is wanting often in progressive paralysis when the light reaction is completely preserved. Thus it appears that the sympathetic reaction is almost always lost before the light reaction. The paradoxical reaction of the pupils appears (1) with the Argyll-Robertson pupil when the sympathetic reaction is preserved, and (2) with the Argyll-Robertson pupil and lack of sympathetic response, when in conjunction with insufficiency of the interni a movement of abduction is made when the eyes are illuminated.

SARADETH (514) reports a case of panophthalmitis in a primipara of thirty-four with a delicate constitution. The sight of the right eye was lost, but the patient recovered otherwise completely in the course of three months.

This case is an exception, for with metastatic irido-choroiditis the prognosis as regards life is usually bad. Of 105 cases of puerperal ophthalmia found in the literature by Axenfeld there was a fatal outcome in 75.

BELILOWSKY (515) observed a case of punctate infiltration of the cornea with hypopyon and T + 1 in connection with dysmenorrhœa and oöphoritis, a case of neuro-retinitis after suppression of the menses, a case of bilateral optic neuritis after the sudden onset of the climacteric period, and a case of perforating corneal ulcer in the ninth month of pregnancy which recovered after an induced abortion. In all these cases the author supposed a causal connection to exist between the genital affection and the eye disease. HIRSCHMANN.

The fact that in Italy, at least, a far greater percentage of cases of amblyopia are due to tobacco than to alcohol, leads BOCCHI (516) to propose a separation of the two varieties, since, in his opinion, retrobulbar neuritis due to the abuse of alcohol is never seen. KRAHNSTÖVER.

III.—**Das Sarkom des Auges.**—By Dr. R. PUTIATA KERSCHBAUMER, of St. Petersburg. A beautifully gotten up octavo volume of 285 pages and 16 exquisitely executed large lithographic drawings on 10 (mostly double) plates. J. F. Bergmann, Wiesbaden, 1900. Mk. 16.

The authoress, well-known by former publications of scientific and practical character, successfully conducted, for a number of years, an ophthalmic hospital at Salzburg, Austria. Besides having personally treated numerous cases of ocular sarcoma, she had the good fortune that Prof. Hubert Sattler put at her disposal, for the work under consideration, the anatomical collection and case histories of the ophthalmic clinic of the University of Leipzig.

PART I. deals with the anatomy and histology of the ocular sarcomas.

Chapter 1 gives a connected description of these growths according to their **pathology**, classifying them into angio-sarcoma, melano-sarcoma, leuco-sarcoma with hematogenous pigmentation, fusiform sarcoma, combination tumors, and degenerative processes, 30 pages.

The classification according to their **site** (Chapter 2) distinguishes diffuse, or flat, and circumscribed sarcomas.

Chapter 3 deals with the primary (injuries, inflammations, vascular changes) and the consecutive affections (inflammation, glaucoma, changes of the lens) in sarcoma.

PART II. gives 67 very clearly presented case-histories (170 pages). We note

7 cases of **diffuse** sarcoma.

9 cases of **epibulbar** sarcoma, of which we mention: Case 8, epibulbar sarcoma, originating in a birthmark; enucleation; relapse; death by metastases. Case 9: Epib. melano-sarcoma,

originating in a pigmented nævus, which from childhood had been noticed as a small black patch near the nasal margin of the cornea. It remained unchanged until the thirty-seventh year of the patient, when it increased rapidly, was removed, relapsed, developed into a large tumor, extending into the orbit. Exenteration of orbit. Six years later, when last seen, no relapse.

2 cases of sarcoma of the **iris.**

8 cases of sarcoma of the **ciliary body,** extending interiorly by invasion of the contiguous structures, exteriorly through the lymph sheaths of the anterior ciliary and the vorticose veins.

41 cases of sarcoma of the **choroid,** of which 28 were situated in the posterior polar region, 7 in the equatorial zone, and 6 were too far advanced to recognize their starting-point.

PART III. **Clinical Conditions.** The authoress adopts the usual four stages: 1. Development [non-irritative or latent]. 2. Increase of eyeball tension [glaucomatous]. 3. Extrabulbar propagation. 4. Metastases.

In 12 fatal cases the following metastases were noted: brain, 3; brain and liver, 3; liver, 1; liver and lungs, 5. Death occurred at the earliest period three months after the operation, in most cases during the first year, only in 4 later. One case, as mentioned above, was living six years after the operation.

The authoress cites a case of Prof. H. Sattler's. During the enucleation of a shrunken eye, Prof. S. noticed that an intraocular sarcoma had perforated the posterior part of the sclerotic. At once he supplemented the enucleation by an extensive exenteration of the orbit. The patient is still under observation, and thus far, seven years, no relapse has occurred.

As inflammatory complications, acute and chronic choroiditis, irido-cyclitis, and even sympathetic ophthalmia are on record. They originate in foci of decaying tumor-substance, which penetrates into the tunics of the eye, causing the above inflammations. The authoress details a case from her own practice. The left eye of a girl of ten years was hurt with a stick, inflammation followed, and when first seen the eye had been blind a year. In the last four months it had been more or less painful. In the right eye, pain and impairment of sight had been present for six days, rapidly increasing. Serous iritis, with posterior synechiæ and optic neuritis; S = fingers at $1\frac{1}{2}$ *m.* Immediate relief and gradual recovery after exenteration of the left orbit; discharged with S $\frac{6}{12}$. The tumor of the left eye was a melano-sarcoma,

which had perforated the posterior part of the sclerotic and filled the whole orbit. Authors think that the cause of the sympathetic inflammation in these cases is not the injury and its consequences, but a "phlogogenic substance." The author discusses the differential diagnosis and treatment in a scholarly manner.

A bibliography of 784 numbers is appended, as well as a page of "errata," where the reader is expected to read "Ponas" for "Pana."

The sixteen figures constitute an atlas, presenting the chief features of ocular sarcoma. They are all instructive, some unusually so, for instance Figs. 6, 8, 11, 15, 16; others might have been omitted, for instance Figs. 2, 3, 5, 13.

Dr. Kerschbaumer's book is a valuable contribution to the ontology of the eye, and will be read by every ophthalmologist with satisfaction and profit.

H. K.

IV.—**Die Neurologie des Auges.** Ein Handbuch für Nerven- und Augenärzte. By Dr. H. WILBRAND and Dr. A. SÄNGER. First vol., second part. Wiesbaden: J. F. Bergmann, 1900. 388 8vo pages, with 88 text-figures. $2.

We can only add that the second part, concluding the first volume of this exhaustive treatise, sustains the high opinion we conceived of the first part, reviewed in vol. xxviii., p. 121. This second part contains: 5. **The Ptosis of Syphilis,** and among other subjects treats of the gummous inflammation of the periorbita in the superior orbital fissure and in the tissue of the cavernous sinus; the ptosis in the basal syphilitic affections of the third pair; the ptosis of the basal syph. meningitis; the changes in the radical, nuclear, supra-nuclear, and cortical regions of the third pair; furthermore, the topical diagnosis of the site of the functional disturbances of the third pair in syphilis; the ptosis isolated or combined with other structures supplied by the oculo-motor communis.

6–8. Ptosis from hemorrhage, softening, and abscess of the brain.

9. Ptosis in basal affections: tumors, inflammations, fractures, and sinus thrombosis.

10–11. Traumatic ptosis. Ptosis in cerebral tumors, multiple neuritis, Landry's paralysis, and polymyositis.

15. Functional ptosis: hysterical, and in recurrent paralysis of the third pair.

Chapter viii. The **relation of the facial nerve to the eyelids,** dealing with spasmodic and paralytic affections.

The industry with which this work has been prepared is astounding. Being the most thorough book of reference we know of, it is not likely that in search of anything it will ever disappoint us, but even if it has the character of a dictionary or an encyclopedia, just its thoroughness draws out our attention and interest in reading select chapters for deeper information. H. K.

V.—**The Refraction of the Eye,** including a complete treatise on ophthalmometry. A clinical text-book for students and practitioners. By A. EDWARD DAVIS, Adjunct Professor of Diseases of the Eye in the New York Post-Graduate Medical School, Assistant Surgeon to the Manhattan Eye and Ear Hospital, etc. With 119 engravings, 97 of which are original. New York : The Macmillan Co., 1900. 8vo, 431 pages, well printed. $3.

The illustrations are very neat, mostly outline drawings. The work treats of refraction, and somewhat also of motility (strabismus and insufficiencies), essentially in the same manner as the many modern text-books on this scientifically most interesting and practically very important subject. Ophthalmometry is presented in full detail of the construction and use of the ophthalmometer. Throughout the book the description of each variety of refractive error is supplemented by illustrative cases, for a thorough practical drill. The author distinguishes anisometropy from antimetropy : the former meaning unequal, but the same kind of refraction in the two eyes, the latter opposite refraction ; the one myopic, the other hyperopic. An appendix describes the improvements of the ophthalmometer made recently, also Reid's and other ophthalmometers. Davis's treatise can be heartily recommended as a first-class elementary school book in refraction.

H. K.

VI.—**Skiascopy.** A treatise on the shadow test in its practical application to the work of refraction, with an explanation in detail of the optical principles on which the science is based. 8vo, 217 pages, with 69 illustrations and 4 plates. Published by *The Keystone,* the organ of the jewelry and optical trades, Philadelphia, 1899. $1.50.

This is a book the oculist as well as the optician will be benefited by reading. Besides the optical principles of skiascopy, it teaches, in minute detail, with the aid of numerous drawings, all

the manipulations employed in this test, and furthermore the description and illustration of the various devices and apparatus now in use. A working acquaintance with the optician's work is indispensable for the oculist, and he can acquire a good deal of it from this book. H. K.

VII.—**The American Year-Book of Medicine and Surgery.** A yearly digest of scientific progress, etc. Under the general editorial charge of GEORGE M. GOULD, M.D. Surgery. 8vo. Philadelphia: W. B. Saunders, 1900.

The ophthalmological section of this book comprises 58 pages, prepared by Hansell and Reber of Philadelphia. It contains the usual brief references to papers of importance classified in such a way as to be easy for reference. W. A. H.

VIII.—**A Pocket Medical Dictionary,** giving the pronunciation and definition of the principal words used in medicine and the collateral sciences. By GEO. M. GOULD. Fourth edition, revised and enlarged. P. Blackiston & Son, Philadelphia, 1900. 12mo, 837 pages, 30,000 words. $1.00.

This little book, printed in small type, on thin paper, the words in antique, the explanations in roman, is carefully put through the press. It is copious, up-to-date, reliable, and handy.

H. K.

MISCELLANEOUS NOTES.

RESIGNATIONS AND APPOINTMENTS.

Prof. C. SCHWEIGGER has resigned the chair of Ophthalmology at the University of Berlin, which he has held since the death of A. v. Graefe in 1870. He will continue his work as the Editor of the German edition of these ARCHIVES.

Prof. J. VON MICHEL, of Würzburg, has been appointed his successor.

Prof. CARL MELLINGER, of Basel, has been appointed Professor in Ordinary.

Professor WOLFRING, of Warsaw, has resigned.

Dr. A GRUENOUW, of Breslau, has received the title of Professor Extraordinary.

C. DEVEREUX MARSHALL has resigned the Curatorship at the new Royal London Ophthalmic Hospital, and

W. T. LISTER has been appointed his successor.

Prof. CESARE PAOLI succeeds Prof. L. GUAITA at the University of Siena, Italy.

HOSPITAL NEWS, SOCIETY MEETINGS, ETC.

OPENING OF THE NEW BUILDING OF THE ROYAL LONDON OPHTHALMIC HOSPITAL.—On June 27, 1899, the new hospital in the City Road was opened by the Duke and Duchess of York, the foundation stone of which had been laid by the Prince of Wales in 1897.

The hospital was opened for the treatment of patients at the beginning of September.

XIIIth. International Medical Congress, Paris, Aug. 2–9, 1900. Section of Ophthalmology.

The three subjects for general discussion, published in our last issue, have been increased by four others, viz.:

1. The actual status of our knowledge on the mechanism of accommodation. Introduced by Professor Hess (Marburg).

2. Reform in the designation of visual acuteness. Introduced by Javal.

3. On glaucoma following cataract operations. Introduced by Wicherkiewicz (Warsaw).

4. The treatment before and after the operations of cataract. Introduced by Dr. Schiötz. The introductory addresses will not be read at the meeting; they will be handed, printed in extenso, to the members of the section. Only a short abstract will be given of the addresses, after which the discussions will begin at once.

Voluntary contributions will be read and discussed after the discussions of the general subjects. The secretaries will give a short abstract in two of the three languages of the Congress (French, German, English) in which the paper was not read; for instance, when a paper is read in German, the secretaries give a résumé of the paper in French and English. The Secretary (Dr. Parent, 26 Ave. de l'Opéra) asks authors to send the MSS. of their papers as soon as feasible.

The two American medical conventions, the fifth triennial congress of **American Physicians and Surgeons,** to be held at Washington, May 1st–3d, and the meeting of the **American Medical Association** at Atlantic City, N. J., June 5th to 8th, promise to be well attended and full of interest.

The **German Ophthalmological Society** will meet at Heidelberg September 13th, 14th, and 15th.

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